The SHIPPING WORLD
AND SHIPBUILDING & MARINE ENGINEERING NEWS

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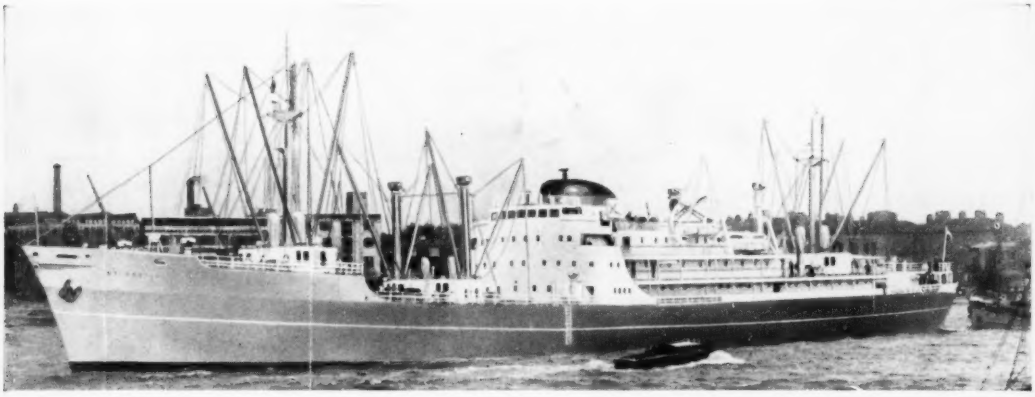

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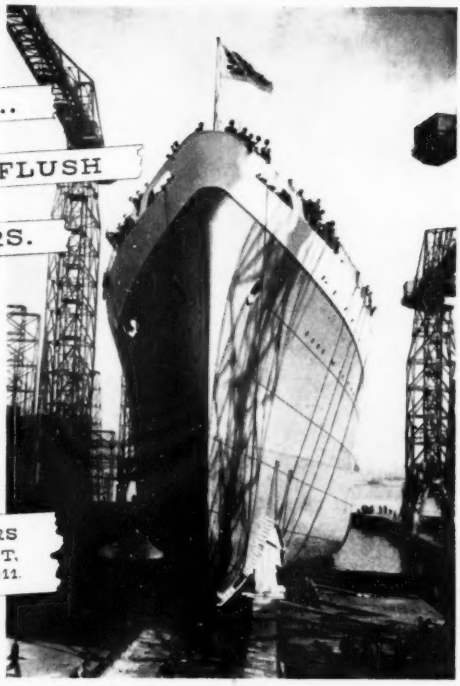

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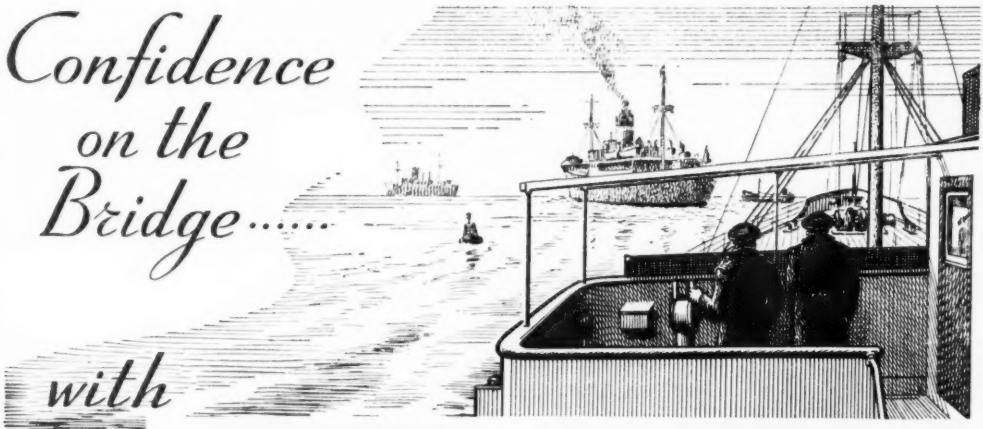

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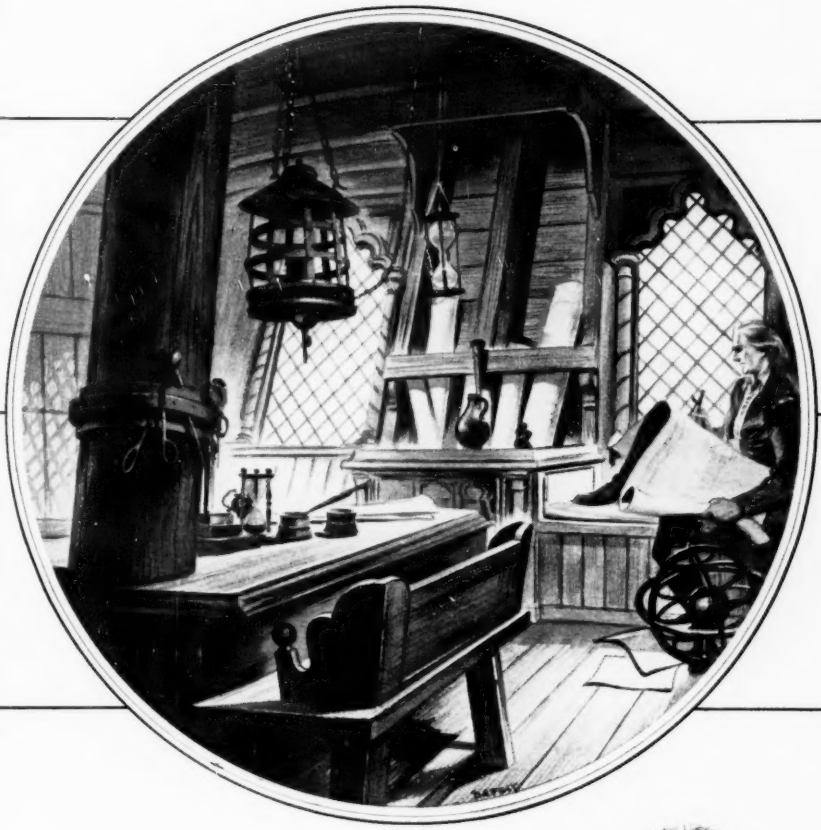

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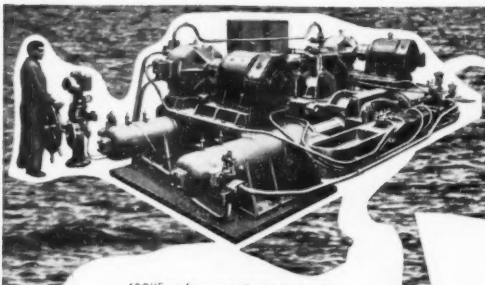

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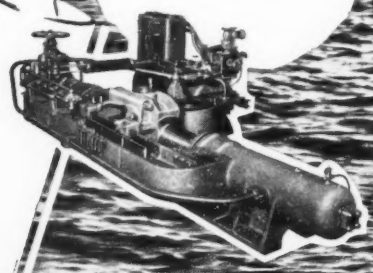

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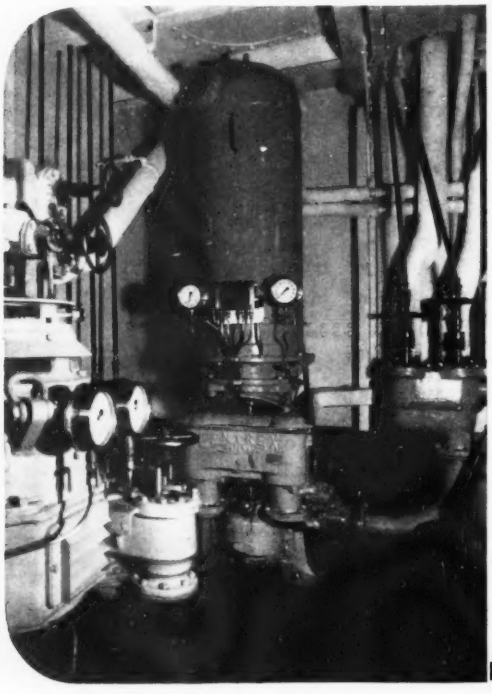

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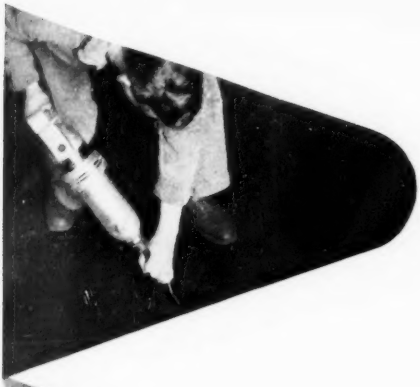

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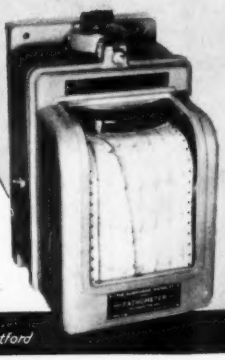

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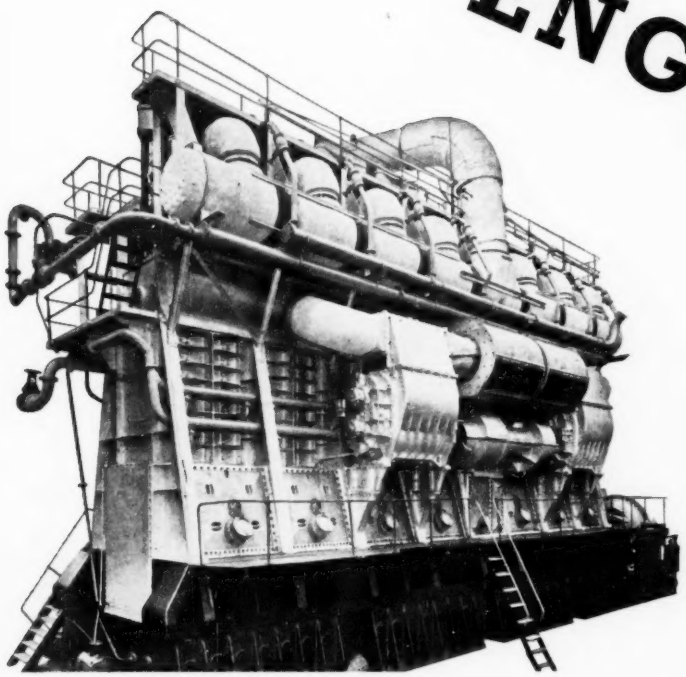

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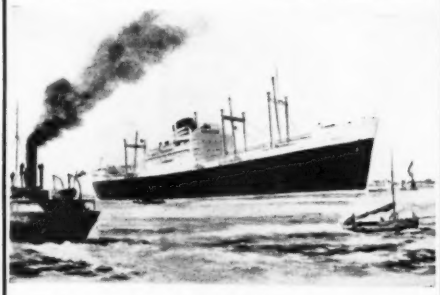

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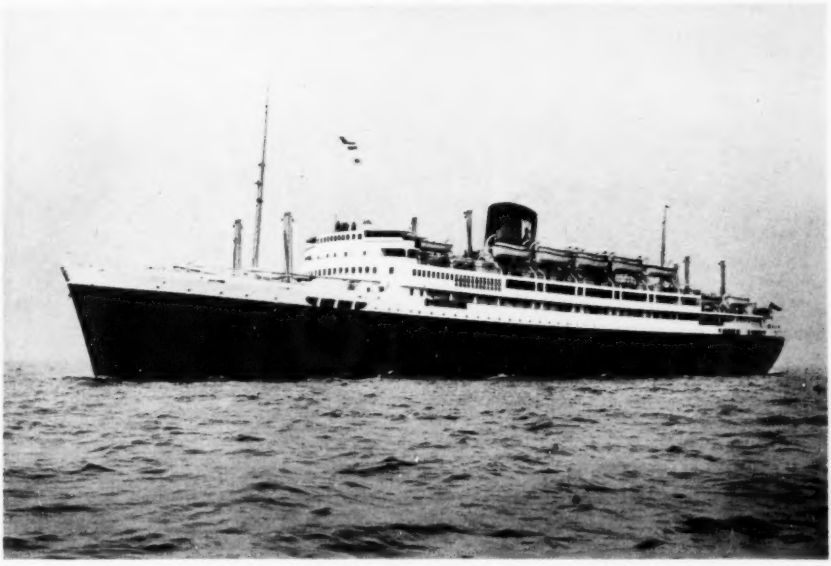

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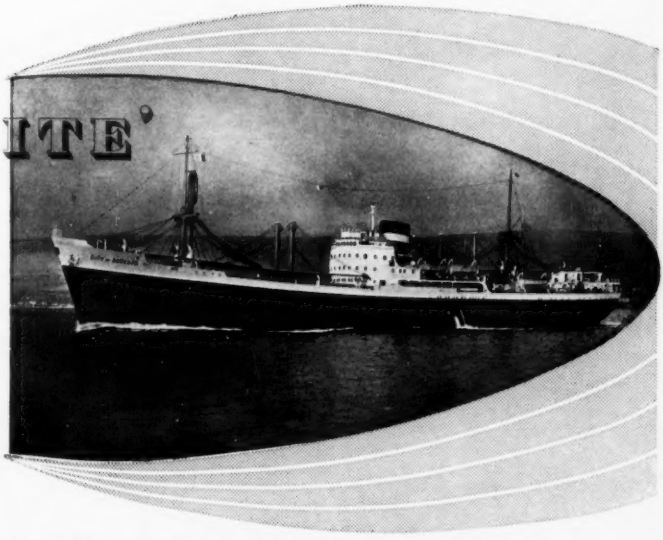

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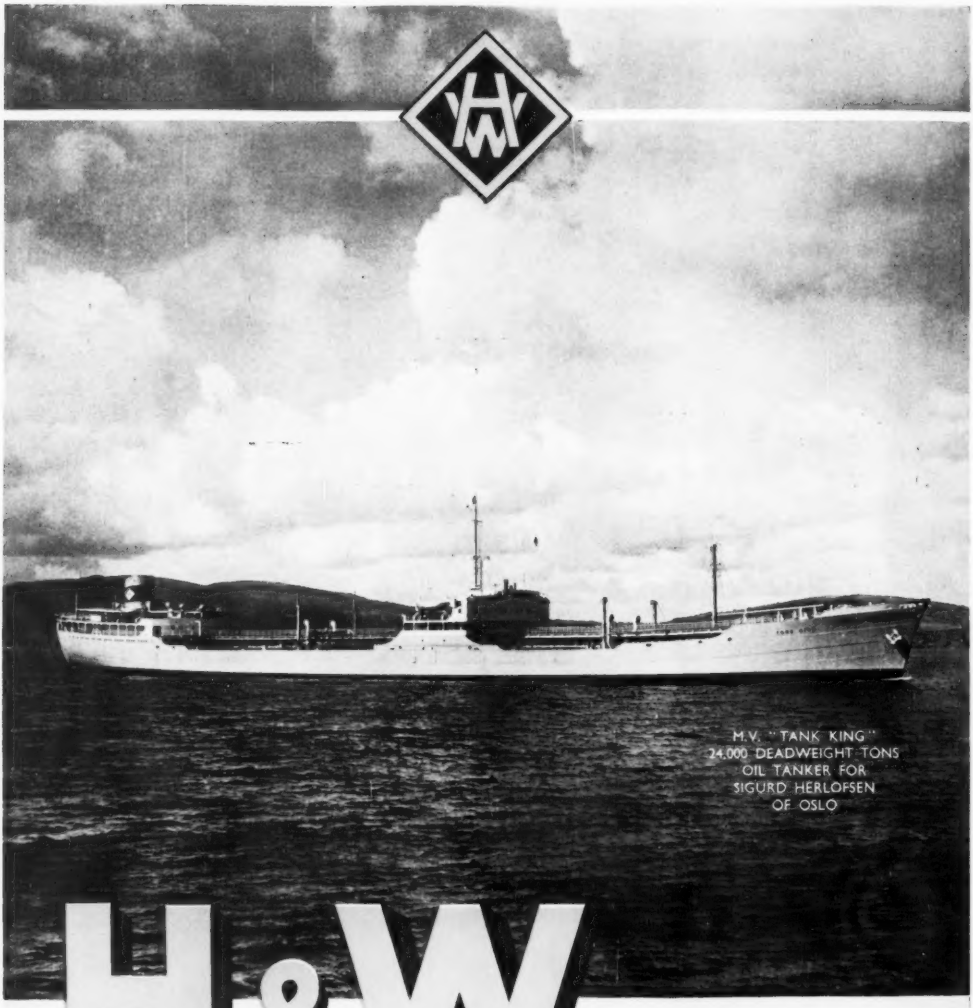

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SHIPOWNERS AND THE GAS TURBINE

THERE IS, and must always be, a time lag between the invention of a new type of marine engine and its widespread adoption in ships. This must be annoying to the enthusiastic technicians most intimately concerned, but the plain fact is that the intervening period between prototype and standard production is perhaps the most crucial stage in the entire development of any item of marine machinery. A ship's engine must be the most economic available in consumption of fuel, lubricating oil and water, where the latter is required; it must necessitate the minimum engineroom staff; need the least possible maintenance and, last but not least, be as reliable as possible. In future years, it may also be essential that it must take up the least possible space in a ship, but that proviso waits upon a reform of tonnage measurement, the movement towards which is so tardy as to be almost imperceptible. In passing it might be noted that over-enthusiastic claims in the initial stages do a great deal of harm to normal and reasonable development. Nevertheless, particularly in this technical age, shipowners take a great interest in new devices and techniques from the first stages, and their interest in gas turbines and all that they may mean is most keen. The excellent paper from which abstracts are given in these pages provides food for thought, and also for gratification, since the first ocean-going ship in the world to enter service with a gas turbine propelling engine is a British ship, the Anglo-Saxon Petroleum Company's tanker *Auris*. The author pays tribute to this ship and the many other gas turbine developments achieved and now in prospect in Great Britain.

What has been achieved? Four gas turbines have now seen actual marine service, the most significant being the 1,200 horsepower unit in the *Auris*. Ten further marine units have been completed but not yet installed, while six other marine gas turbines are now under construction in Britain, the United States and France. It would seem that it is only below about 10,000 horsepower that the gas turbine compares favourably with a steam turbine, at the present moment. This would argue that unless further technical developments are made which alter the present conclusions of the author, a large trans-Atlantic passenger ship would need up to 16 or 18 such units to give the 32 knots now expected of express liners on this route. British opinion in some quarters differs from this, though only in degree. The limitations on size of engine are accepted for the time being, though it is thought that a case may be made out for engines up to 20,000 horsepower, so that a 32-knots liner would need eight units, in association with electric transmission. Two engines could be geared to each shaft, but this would necessitate four variable-pitch propellers, a complication which might favour electric transmission.

The more immediate interest is, however, likely to be in gas turbines from 2,000 to 10,000 horsepower—that is, the range which could serve cargo liners and tramps. In this connection, it may be noted that though a gas turbine for these ships, all of which need more volumetric capacity for cargo, could give a saving in engineroom space of up to 20 per cent as compared with a diesel-engined ship. However, in a case recently calculated, the hold capacity was increased by 8 per cent because of having a smaller engine room, but the tonnage dues were increased by 41 per cent; the urgency of tonnage measurement reform can thus be clearly seen. If the gas turbine can be shown to be capable of burning heavy oil fuel without too much maintenance costs, the fact that fuel costs may be as high as 45 per cent more than a diesel ship (though only 10 per cent more than a steam turbine ship) may not be the dominant factor. First cost is very important at the moment and as it appears that a gas turbine engine may be obtained at some 22 per cent less than the cost of a diesel engine this may be the decisive factor.

Current Events

Communist Manœuvres

WITH the concessions of an 11s. increase in wages and a second week's holiday which have just been made to the shipbuilding and engineering workers, the total wage increase in industry generally will come to about £500,000,000 in the next twelve months. In other words, there will be greater spending power to that amount, while the supplies of food and other things will be no greater, indeed smaller, so that prices will inevitably rise. Consequently, though the pay packets will be better filled with Treasury notes, the recipients will be little, if at all, better off than they were. The Communists intend to make the most of this situation, believing that their chances of mischief-making were improved during the recent General Election when they gave support to Socialist candidates. In a report, which he has just issued, Mr. Pollitt, the Communist leader, says "Our party membership will help the left-ward-moving workers to take seriously the need to use to the full the great opportunities in their trade unions for strengthening the local Labour parties, changing the policy and leadership of the Labour party, and securing that on the Parliamentary panels the best militant candidates are put forward, including members of the Communist party who pay the political levy." It is added that if the same care and thought were given to securing that the best representatives are elected to represent their trade union branches on local Labour

parties, at all Labour party conferences, and as Labour party candidates, as is given to electing workers on trade union committees and to trade union official positions, a profound change could be affected throughout the Labour party and all its organisations. This declaration represents a further challenge to the officials at Transport House, already embarrassed by the rebellion of the Bevanites. The average trade unionist has not the missionary spirit of the Communists, takes little part in union affairs and seldom attends meetings. That is the danger. This indifference may lead to the trade union movement passing under the control of the extremists of the Left Wing.

Wages and Profits

IN THESE circumstances, we shall hear a good deal of talk about profits. It will be suggested that as they are in the "unearned income" group, in the misleading official phrase, their payment is an injustice to the weekly wage earners. Of course, dividends should not be described as "unearned income," for investors have earned their capital by providing land, buildings and plant and after the payment of taxation, get, in fact, a very small return for all the self-denial which has been practised over many years. But, apart from that issue, managements generally will have to be up and doing if the workers are not to be bamboozled by the agents of the Communists and their fellow travellers. Their task is not merely to defend the interests of their shareholders, but the whole future of British industry. Those managements who carry on the maritime industries have a special responsibility, because we live in an island and cheap and efficient shipping services are vital to us. In every shipyard and engine shop statements, certified by qualified accountants, should be exhibited showing exactly how the year's revenue has been expended, the percentages which were spent on raw materials, wages, salaries, renewals, taxation and other expenditure being clearly set out. By such simple means, the workers, who are for the most part intelligent and well meaning, would realise that if all the profits, after taxation has been paid, were added to wages, the pay packets would be little fuller than they are today. Whatever the internal disputes in the Socialist party, they will form a united front with the Communists in misrepresenting the profit earning policy which is the foundation of private enterprise. Managements cannot stand by and let the campaign develop. The issue is not one of party politics, but of national survival. It can be presented in such a way as to raise no party animosity. Let the facts and figures speak from the walls of shipyards and engine shops. Some managements have given the lead in this matter and others will no doubt follow their example in view of the activity of the Communist party.

Dearer Ships

TO WHAT extent will the cost of the increases in wages conceded to the shipbuilding and engineering workers fall on the various sections of the maritime industries? Of course, the shipyards are full of work, and will be so for several years to come, and shipowners are not doing badly, owing to temporary conditions which favour the freight market, though they are not able to look ahead with any assurance that freights will keep up for long, owing to the influence of international politics on sea transport. They have ordered a large volume of tonnage and little of it at fixed prices, so they may have to bear all, or much, of the new burden. It will be a matter of consideration for all those who design and equip ships to determine to what extent they should exercise their right to pass on the higher wage to owners, their customers today and in future. A correspondent of THE SHIPPING WORLD has suggested that this matter should be given very serious consideration by those most closely concerned. His argument is that shipping is an international industry and if owners have to pay too much for their tonnage they may, owing to the continuing rise in operating costs, be so handicapped that they will not be in a position to earn sufficient money to lay down new keels as their ships become uneconomic owing to age or other cause. They have already, he adds, a great volume of tonnage which should be replaced as soon as possible. That is not an immediate problem as every berth in this country is full and none will be empty, at least, in the larger yards, for two or three years, owing, mainly, to the continued demand for oil tankers. Taking a long view, our correspondent asks, will it not pay shipbuilders and subcontractors to ease the burden which they could place on the shipping industry? There is a good deal of talk of planning in these days. Is not this, he adds, an opportunity for looking ahead to the time when the present pressure on the shipyards has been relieved and shipbuilders will be eagerly seeking orders? "Their success will depend on the way in which the new situation created by the wage concessions is handled." It is obviously in the interests of all concerned that the merchant fleets should be maintained in a high state of efficiency, successfully competing against all comers, and that the shipyards should be in a position to quote acceptable prices not only for British orders but also for orders from overseas. "What," he adds, "will shipbuilders, who have the whip hand at the moment, do? Will they take full advantage of their favourable position today or will they decide to adjust matters so that shipowners, here and overseas, will feel that they have been treated reasonably, if not generously?"

Trends in Welded Shipbuilding

ALTHOUGH it is some thirty years since the first all-welded ship was built in Britain, the full impact of welded technique on British shipbuilding generally has only been felt since the war. Though much publicity has been given to the all-welded ships built in the United States during the war, it is not so well known that several vessels, notably some of the standard fast cargo liners built in the United Kingdom during the later war years, were in fact very largely welded. It is natural to ask why, in this case, it has taken some years to develop as an almost standard practice the largely welded merchant ship in this country. In the first instance, when building in peacetime for a private shipowner, cost is a paramount factor, and the comparison between riveted and welded building costs in 1946 was against welding. Prices worked out at that time for long stretches of seams showed that with both riveting and welding carried out by hand, the second and newer method cost from 12 to 15 per cent more, taking into account all factors involved. The position now in many of our shipyards is that welded construction may be from 3 to 7 per cent cheaper than riveting, while in one or two cases a slightly greater saving can be achieved. It must not be forgotten, however, that to attain this standard of welded construction it is necessary to introduce many new and costly methods, plant and facilities which must be written off in future years, so that full advantage cannot be given to shipowners unless a taxation system which encourages such initiative is brought into being. In general, it may be said that shipbuilders have proved themselves to be far sighted with regard to welded construction. It is now up to the Government to encourage them, as far as the financial state of the country will allow, in extensions of their modernisation. The fact that these measures combine to make smaller demands on steel for the same type of ship previously riveted is a powerful argument for special consideration.

Good Work

THE WORK of the Royal Navy in keeping the Suez Canal open to the shipping of all nations has been given well-merited recognition in the Press. The first necessity was to have available on the spot sufficient

armed force to maintain a general control of the situation, and this has been provided by ships of the Mediterranean Fleet, which have been stationed at both ends of the Canal. In addition, however, the Navy has had to provide men and boats to carry on the services normally provided by Egyptian labour, and, in particular, the mooring at Port Said of vessels waiting to pass through the Canal. For the past month this work has been done by the officers and ship's company of H.M.S. *Gambia*, a cruiser which has recently been relieved in the task by H.M.S. *Liverpool*. The *Gambia* was on passage to the East Indies when she was ordered to Port Said, and until she was relieved the ship provided the headquarters and the radio services necessary to keep shipping flowing steadily through the Canal, while her crew undertook the many duties required. Several hundred Egyptian watermen normally engaged in mooring ships were replaced by 70 men from the *Gambia*, operating in a motley collection of boats comprising six assault craft, the ship's pinnace and cutter, and two fast motorboats. The *Gambia* also maintained armed waterborne patrols, and carried out a number of other services. The Navy is accustomed to carry out its own mooring duties, and boats' crews are trained in this work. When working with merchant ships of many nationalities, however, the hazards are naturally increased. One boat was lifted out of the water by the propeller of a (foreign) merchant ship which turned before the boat was clear, while another was rammed and had to be beached. In each case the cruiser's engineers had the craft in service again within twelve hours.

Restrained Distribution Policy

BENEFITING by the sustained rise in freight rates—a rise that has more than offset the increase of working costs—the report of the Dene Shipping Co., Ltd., for the year ended July 31 last records group trading and other profits of £257,400, against £149,500. Tax takes as much as £108,900, but the dividend of 15 per cent, against 10 per cent, on the one-class capital of £312,500, is nearly 3½ times covered. It costs no more than £24,600 net, compared with transfers to reserves and provisions totalling £54,500 and with £6,700 added to the carry forward at £33,700. Distribution policy is thus again restrained. The latest consolidated balance sheet discloses commitments of £298,500 for new construction. In this connection it may be pointed out that a new vessel, the *Exedene*, was delivered at the beginning of August and is now satisfactorily employed, and that the company expects to take delivery of a further vessel in February, 1953. There is no comment in the report on the adequacy of the company's liquid resources. These consisted at the financial year-end of £127,600 in cash and £76,700 in Government securities. In addition, the company then held £112,000 in other investments. Moreover, the company had still to receive the purchase money of the *Riodene*, sold this year to the Silver Line. That receipt may, of course, be employed in financing the recent purchase from the Treasury of its holding of 380,866 shares in the Silver Line at a price not yet stated. This acquisition is described by the chairman, Mr. Henry Barraclough, as constituting a "sound, long-term investment." With new tonnage in commission and the freight market still firm, Dene Shipping should do well in the current financial year.

A Flourishing Fleet

STARTLING changes appear in the balance sheet of the United British Steamship Co., Ltd., dated June 30 last. During the year 787,500 new ordinary shares of 1s. each were issued at 10s. per share to help provide funds for additions to the fleet. This transaction raised the issued one-class capital from £78,750 to the still modest figure of £118,125, on which assets totalling £2,287,000 have been built up. It also brought in share premiums of £313,000. With this addition and allocations from the past year's profits, reserves now stand at the imposing figure of £1,369,000; and the year closed with £1,784,000 cash in hand. The company's finances are thus strong, though it must be borne in mind that capital commitments amount to £2,000,000. The fleet is being modernised. Since the date of the last annual general meeting, two of the company's old steamers have been sold, leaving it with two motor vessels, two oil-burning steamers and two coal-burning steamers aggregating 60,000 tons d.w. and averaging about 12½ years of age. The book value has been heavily written down to £224,000 net, after sales and depreciation. Contracts have been placed for considerable new tonnage consisting of three new motor vessels of 10,000 tons d.w., costing approximately £430,000 each, two of which are due for delivery in the spring of 1952 and the third in 1953, and of two further motor vessels of 10,000 and 10,900 tons d.w. respectively, for delivery towards the end of 1953. This new construction will, in time, add largely to the company's income. In the year under review, voyage and other profits rose from £341,000 to £437,000. Tax, however, took £250,000 (against £145,000) so that the net profit was left slightly lower at £179,000 (£188,000). The repeated dividend of 100 per cent on a larger capital was well covered; it cost £62,000 net, compared with £115,000 transferred to the contingency and survey reserve and £2,000 added to the carry forward.

Casualties in October

ACCORDING to the monthly casualty returns of the Liverpool Underwriters' Association, October was a particularly bad month for marine underwriters. While in every month of 1951, the returns have shown a numerical increase in the number of casualties compared with the same month of 1950, in some months the increase has been slight. In October, however, 695 casualties were recorded, 119 more than in October 1950, and it is now apparent that when the figures for the year are complete, 1951 will show a substantial increase in casualties. In October collisions, 168 in number, were most numerous, followed by 127 cases of machinery damage, 121 strandings, 66 cases of heavy weather damage, 34 fires and explosions, two founderings and one mine casualty. This leaves 176 "other casualties" to make up the total for the month. October's total losses consisted of three steam and two motor vessels, aggregating 13,355 tons gross, compared with seven steamers and one motorship (14,824 tons) in October 1950, and eight steamers and two motorships (21,500 tons) in October 1949. The one mine casualty was disappointing in that it occurred in the North Sea area, in which up to the end of 1950 the mine peril was most serious. Except for one small vessel, no mine casualty in the North Sea or elsewhere had been reported since last May and it may well be that the absence of mine casualties during the June and July influenced to some extent the reduction in certain Scandinavian cargo war risk rates made by the Joint War Risk Rating Committee of company and Lloyd's underwriters in August. October's mine casualty was to the French steamer *Rhuys*, off Terschelling, and she was towed in to Ymuiden with damage to machinery and steering gear. This suggests that the mine was detonated after the greater part of the length of the ship had passed over it, owing to exhaustion of the battery, and it is thought that within a comparatively short space of time exhausted batteries will render mines which depend on electrical impulse for detonation innocuous.

"WORLD SHIPBUILDING"

A study of taxation policy as it affects shipbuilding is one of the features of the current issue of WORLD SHIPBUILDING, the international shipbuilding quarterly published by The Shipping World, Ltd., which is now available. It also contains a survey of the measures being taken in the principal shipbuilding countries of the world to overcome the shortage of steel. Developments in merchant ship design since 1945 are surveyed in a paper by Mr. P. R. Salisbury, lecturer in naval architecture at the University of Queensland.

ON THE "BALTIC"

PROSPECTS FOR NEXT YEAR'S MOVEMENT OF GRAIN

By BALTRADER

IT IS a time of the year when new season chartering is often in full swing to lift the first cargoes of new grain at Australian ports. This year, business in that market is slow in getting under way. The drought which hit Queensland has also affected New South Wales, from which State it is not expected that shipments will be made. New South Wales was similarly unable to export grain in any quantity during the past year, the reason being the excessive rains of 1950, which will be remembered by those interested in the Test Matches. Owners miss the opportunity of loading their vessels with bulk grain at Sydney, where the silo facilities for rapid work have a high reputation. The other three grain States, West Australia, South Australia and Victoria, have enjoyed a fairly good harvest, but the absence of New South Wales from the field of export will prevent Australia from contributing as much employment as owners could wish during the coming months.

Apart from natural conditions, there is the fact that a smaller acreage of wheat was sown in Australia than in past years. Among the reasons for this were the reduced price of wheat for home consumption and the increased profits obtainable by devoting more labour and resources for the production of wool. Any decline in the export of grain from Australia will be the more noticeable in view of the exceptional number of vessels on their way or chartered to sail to Australia from Europe with motor cars and other general cargo; also the concourse of shipping in India after discharge of North American grain. At the same time, any reduction of wheat shipments from Australia should be offset by a corresponding amount of grain obtained from North America, which seems to have enough and to spare to make up any deficiencies elsewhere.

The Short Atlantic Run

It has often been said that world crops almost always come to each other's aid when needed. If one great area is short, another makes good the deficiency; that theory holds good at the present time, the shortage being more that of shipping than of the world supply of grain. It may be expected that a great deal of the tonnage which will be discharged in the area of Australia and India will continue to find its way to the North Pacific or even, as recently, to the Gulf of Mexico. It is, of course, unfortunate that a bumper harvest of Australian wheat is not available to supply British requirements with a sterling product. From the shipping angle it may cause some reduction in the aggregate amount of grain imported to the United Kingdom, in order to save dollars. Another factor is the short duration of the trans-Atlantic voyage in comparison with the run home from Australia. The rapidity of loading in North America further shortens the voyage, as well as the speedy erection of shifting boards; besides the fact that the shifting boards are left in position after discharge in this country when another cargo of grain in bulk is to be fetched from America.

In this respect, there is one qualification, namely that in some ports, Birkenhead for example, the archaic method of tub discharge is used instead of elevators, which necessitates the dismantling of the shifting boards. One important factor can, one fears, be relied on to count as an offset to the speed with which grain is brought to this country from North America. We are short of labour and equipment to handle the discharge of grain and every other commodity, at any rate as far as tramp cargoes are concerned; vessels queue up for berths and the delay hinders shipping from overtaking demand. The opposition on the part of the men to the use of London's fine new elevator suggests that we are not at present likely starters in a race with the Continental grain ports.

Voyages with grain to Great Britain, although a very important part of the British tramp owners' repertoire, have to compete with more alternatives than ever before. The liner companies, for instance, continue to offer attractive employment in various directions. It is noticed that the West African lines are beginning to look round for more tramp tonnage on time charter, after a conspicuous absence from the market. Trips to Australia and the Far East on time charter are frequently arranged. Coal charters from the United States to Europe will go on being fixed in large numbers, including those which, unfortunately, will be required to keep us going. Timber from British Columbia and the western United States is waiting to be shipped to Great Britain, South Africa and Australia. If China and Manchuria begin again to export soya beans and grain on the scale of a year ago, the charterers will probably have to offer more inducement than of late, perhaps in order to draw tonnage from Australia.

The Freight Market

There has been rather less chartering from Eastern North America than in previous recent weeks; but inquiry persists for tonnage to load American coal for Europe. A typical fixture is *Villa Di Brugine*, Hampton Roads to Rotterdam, 9,200 tons, 10 per cent, at $10.50, option Hamburg or Bremen $10.95 for three consecutive voyages, beginning December. The *Evros* or substitute, 9,200 tons, is fixed for coal from Hampton Roads to Lower Plate at $18.75, option up River at $19.50, November. The *Hermiston*, 7,000 tons, will take sugar, Cuba to U.K., at 137s. 6d., January, and Cuba to Karachi has been fixed at $30.75, January. There has lately been quite an active market in parcels and full cargoes from the River Plate. The *Prospero*, 7,200 tons, 10 per cent, is fixed from up and down River to Antwerp-Hamburg range at 95s., heavy grain basis, with option Gothenburg-Malmo range at 114s., option Antwerp or Rotterdam and one Sweden as above at 120s., December 1/20. North Pacific charterers are open for grain and lumber carriers for various destinations. Recent fixtures include *La Cordillera*, 8,400 tons, British Columbia or U.S. North Pacific to U.K. at 145s., heavy grain, option Antwerp-Hamburg at same rate except Antwerp or Rotterdam at 142s., January/February. The Baltic Chartering Committee has taken *Tarsian*, 9,200 tons, for grain from Dairen or Chinwangtao to full range India at 130s., December 24/January 29, also *Eleni Stathatos*, December/January and a January vessel at the same rate. Inquiry for vessels on time charter is very well maintained and more tonnage is required for the run out to Australia, South Africa and the East. The West African Lines have renewed several charters, including: *Beaconsfield*, 9,028 d.w., 486,000 ft. bale, 10 knots on 16½ tons, oil, 52s. one West African round, direct continuation, delivery U.K.; *Lloydcrest*, 9,925 d.w., 492,000 ft. bale, and *Rivercrest*, 9,925 d.w., 495,000 bale, both 10 knots on 21/22 tons, oil, 50s. for a West African round, continuation of present charter. The *Polamhall* (m.v.), 9,220 d.w., 515,880 bale, 12½ knots on 12½ tons, oil, is fixed for a trip to Australia at 67s. 6d. per month, delivery U.K. January/February.

Air Charter Business

Rather more inquiry is reported in the Air Charter market during the week; but Christmas traffic in freight

(*Continued on page* 384)

INFLATION AND THE MARITIME INDUSTRIES

EFFECTS OF INFLATION AND HIGH TAXATION ON CAPITAL RESOURCES

By PETER DUFF

A SPECIAL PANEL of the Federation of British Industries has made a study of the effects of present methods of taxation in a prolonged period of inflation on the capital resources of industry. Particular attention has been paid to the problem of replacing assets at prices which are substantially higher than the original cost, and in this sense, in particular, this study* provides valuable support to many of the points raised in the memorandum on taxation published by the General Council of British Shipping last July. The F.B.I. memorandum is the result of a study carried out of the experiences of a considerable number of industrial manufacturing companies. Although the incidence of inflation and taxation on various branches of industry, including the maritime industries, may vary, the general economic trend throughout all industries is much the same.

Costs and Taxes

The fundamental cause of the situation is that since 1939 costs and prices in the United Kingdom (and elsewhere) have been rising virtually without pause. In the United Kingdom the level of taxation has been maintained at a level of over 40 per cent of the national income. This combination of inflation and high taxation, coupled with the existing deficiencies of the methods of computing depreciation allowances, has seriously impaired the capacity of industrial undertakings to maintain their capital resources and to finance essential expansion.

It is frequently contended that the capital resources of British industry are not only being strained, but are even in danger of exhaustion; yet at the same time complaints are repeatedly heard about what are described as excessive profits. As the F.B.I. puts it:—

> The twin questions of the erosion of capital and the adequacy of profits are clearly inter-related, for unless industry is able to provide from its own resources for the maintenance intact of its productive capacity, it is, in effect, living on capital. The maintenance of capital intact, in the sense of preserving the productive capacity of the enterprise, is, in fact, one of the most important responsibilities of management. For the fulfilment of this responsibility only the balance remaining after provision has been made for the maintenance of capital can be regarded as "profit" and as available either to meet taxation or for distribution as dividends.

Two Criticisms

Two criticisms of existing practice are brought out by the Federation. The first is that the traditional form of presenting company accounts is no longer adequate to present a true picture of capital assets or of real profits in a period of inflation; the second is a corollary of the first, namely that the existing method of taxing profits has the same defect—the assumption of stable prices. As it is pointed out, the tax-free depreciation allowances are normally sufficient to provide for the renewal or replacement of fixed assets at their original cost. If, however, the new assets cost more than the old, depreciation set aside on this basis will purchase fewer new assets. Unless other profits are available, either out of retained profits or from outside sources (for example, new borrowing or share issues), capital will be depleted and production or, in the case of shipping, earnings must eventually decline.

It is easy to find a simple example from the shipping industry. Suppose three ships were built in 1931 at the cost of £600,000. Assuming the vessels were fully written off at the end of their life, say in 1951, the capital sum of £600,000 will have been maintained intact, for tax purposes. But in 1951 this sum is sufficient to replace only one of the three vessels, unless a further £1,200,000 can be found out of retained profits or elsewhere. Retained profits used for this purpose are subject to tax, despite the fact that they are required merely for maintaining existing real capital. Thus a tax apparently levied on income becomes in effect a tax on capital; and if the net profits, after tax has been paid, are not sufficient, the capital will not be adequate to keep up production or maintain services at the same level as before. To quote the Federation again, "it is clear that unless industry is able to set aside, out of the profits remaining after taxation, sufficient funds to meet the replacement costs of its assets, it is living on capital." In support of this contention Table I analyses the extent of the problem in the case of the 80 companies involved in the F.B.I. study:—

TABLE I

EFFECT OF DEPRECIATION BASED ON ORIGINAL COSTS IN THE CASE OF 80 COMPANIES

	£ million
A.1. Total original cost of fixed assets shown in 1949 balance sheet (excluding land where possible)	375.3
2. Estimated gross cost, irrespective of the degree to which the above assets had depreciated, of replacing them as new at current prices	782.9
B.1. Total depreciation provision to date in accounts on the assets in A.1 above	188.8
2. Estimated total depreciation provision to date required according to existing methods to provide for depreciation on the assets as valued in A.2 above	426.5
C.1. Depreciation provision made in 1949	19.4
2. Average annual depreciation required to achieve the replacement *when due* of the assets as valued in A.2 above without deterioration in the efficiency of the plant	40.1

The Federation of British Industries, therefore, has shown that the basis of computing depreciation allowances is completely out of joint with the times. In this respect it supports the recommendation of the General Council of British Shipping that:—

> Although it is necessary when computing profits assessable to income tax to allow as a deduction the cost of amortising capital expenditure over its useful life, the deduction ought not to be less than the value of the wastage of fixed assets employed in the business, such allowance to be based on the current replacement value of the assets.

A Special Case for Shipping

On one point the shipping industry may not agree with the F.B.I., although it is a difference of application, not principle. The F.B.I. states that "the replacement of fixed assets is a gradual and long-term matter, and in all replacement there is some element of expansion to be derived from the continual improvements in machine efficiency." It is true that ships built today are more efficient, and better value for money, than the ships of 20 years ago; but it is the unfortunate experience of the shipping industry that the advantage of this mechanical improvement is lost through the greater time taken between voyages because of delays in port. Furthermore, unlike manufacturing plant or buildings, a ship cannot be replaced gradually over a period of years. As the General Council has put it, "when the time arrives to scrap a ship the whole asset has to be replaced in one operation."

The shipping industry is, indeed, more adversely affected than any manufacturing industry by the existing methods of taxation. The General Council's submissions to the Royal Commission on Taxation, therefore, go further than those of the F.B.I. in certain respects. They ask, owing to the great fluctuations which occur in shipping earnings, and their vulnerability to foreign competition in an international market, to be given wide discretion to amortise the cost of their ships as quickly as possible when freight rates are high;

* The Effects of Inflation on Industrial Capital Resources, a case study by the Federation of British Industries.

and they ask also for at least a limitation on the present adverse effects of the so-called "balancing-charges."

Sufficient evidence is now accumulating, it cannot be denied, to show that the prolonged period of inflation is having deleterious effects on the capital resources of all industries, and there is evidence to show that the shipping industry is one of the principal sufferers. What will be the effect of the Excess Profits Tax which the Conservative Government proposes to introduce next year? The danger is that it will serve only to accentuate the defects of the existing burden of taxation, unless the whole system of computing the incidence of taxation be revised, as proposed by the Federation and the General Council, so as to fall in line with the economic realities of the present inflationary situation.

RECENT SHIP SALES

British vessels sold to Japanese owners recently include the cargo steamer *Dingle Bay* (5,058 t.g.), owned by H. P. Lenaghan & Sons, Ltd., Belfast, and built in 1929, now renamed *Asakaze Maru;* cargo steamer *Landsdowne* (6,224 t.g.), owned by Wheelock, Marden & Co., Ltd., Hong Kong, and built in 1922, now renamed *Liverpool Maru.*

Cargo steamer *Carslogie* (3,786 t.g.), owned by the Carslogie S.S. Co., Ltd. (Honeyman & Co.), and built as the *Hartside* in 1924, has been sold to Swedish buyers for about £200,000. She is at present lying at Manchester and is to be renamed *Norania.* She is understood to carry about 6,300 tons d.w.

Cargo steamer *Stancleeve* (5,970 t.g.), owned by the Stanhope S.S. Co., Ltd. (J. A. Billmier & Co., Ltd.), and built at Sunderland in 1942, has, it is understood, been sold to Norwegian owners for a price of £440,000. She has a deadweight capacity of 8,800 tons.

The Genoa shipowner Ditta Luigi Pittaluga has purchased the cargo steamer *Demodocus* (6,595 t.g.) from the China Mutual Steam Navigation Co., Ltd. (Alfred Holt & Co.), Liverpool, for about £135,000. She has been taken over at Liverpool and renamed *Ircania.* She was built and engined by Workman, Clark & Co., Ltd., Belfast, in 1912.

Mersey Docks and Harbour Board

Col. J. G. B. Beazley, chairman of the Mersey Docks & Harbour Board, presenting the accounts for the year ended July 1, 1951, said that the net financial result of the year was not so good as in the previous year. This was owing to an increase in operational expenditure, due in the main to the increasing costs of wages and materials and to certain major repairs to various portions of the Board's estate having to be carried out. The Board had, however, been able to make a contribution of £188,000 to the renewals and depreciation account and to reduce by £11,813 the deficit remaining from the immediate postwar period, the deficit being now £237,520. Steps have been taken since the close of the financial year to improve revenues by increasing rates and dues on vessel and goods. The tonnage of vessels (21,156,984 tons) using the Board's docks shows a small increase over the previous year. The total tonnage of cargo handled during the year shows a marked increase, particularly in the foreign export traffic, which increased from 3,990,000 tons to nearly 4,500,000 tons.

A major problem, he said, was the difficulty of clearing the quays and providing accommodation for vessels and their cargoes. Several factors entered into the problem, but one of the utmost importance was that of the growing volume of export cargo handled through the port, which owing to the longer occupancy of a loading berth than a discharging berth added to the difficulty. Furthermore there was a tendency due to bulk buying and present day abnormalities of trade for very large quantities of particular cargoes to go through the port in gluts. "My predecessor referred last year to the necessity of a port being administered by an authority possessing the requisite local autonomy. Some point is added to this matter at the present time by reason of the recent publication of the reports of the Docks & Inland Waterways Executive on their visits to various ports and the views which they have seen fit to express, but it must not be taken that so far as Merseyside is concerned this Board accept the conclusions arrived at by the Executive, and in fact on some points they definitely disagree with them. I will confine myself today to emphasising that a port is a community and that the individual practices, customs and thought of a port cannot be submerged without losses far outweighing any superficial advantages gained from uniformity and centralisation."

BOOK REVIEWS

Reed's Nautical Almanac, 1952. (Thomas Reed & Co., Ltd., 184 High Street West, Sunderland. Price, 12s. 6d. net.)

The 1952 edition of this well-known almanac, which is now available, in general retains the appearance and content of previous years. As always, it offers excellent value to the coaster master, fisherman or yachtsman navigating in British waters. Among new items included in this edition is a group of 12 star charts showing all the 60 principal stars, together with five supplementary maps. Future additions to the almanac are foreshadowed by the reservation, among the numbers of sections of the book, of five numbers to be used for new sections in later editions.

Ports, Dues and Charges Throughout the World, 20th Edition. (George Philip & Son, Ltd., 32 Fleet Street, London, E.C.4. Price, £6 6s.)

The first edition of this book appeared in 1869, under the title *Dues and Charges on Shipping in Foreign Ports.* Succeeding editions have seen changes in title, contents and appearance, the 19th edition, published in 1930, having been in four volumes. With a period of 21 years separating it from its predecessor, the present edition is, of course, virtually a new work. It has been completely remodelled, and now appears as a single large volume, containing details of over 2,500 ports. The general standard of the entries is high, and the clear layout facilitates easy reference. A notable omission, however, is the whole of the Great Lakes ports, which are now being increasingly used by ocean-going shipping.

Stanford's General Map of Europe (Edward Stanford, Ltd., 12-14 Long Acre, London, W.C.2. Price, 5s.).

This map is one of a series of twelve politically-coloured general maps. Size: 37 in. by 30 in., folding to 9 in. by 5½ in. The scale—1:6,000,000 (95 miles to the inch) is rather small but the map does, very commendably, include such features as pipelines, air routes, shipping routes, etc., still neglected by many well known British mapmakers. The projection is Albers' Equal Area. A series on the same lines on a scale of about 40 miles to the inch would be welcome from this company.

Refrigeration Insulation, by G. Yate Pitts. ("Modern Refrigeration," Empire House, St. Martin's-le-Grand, London, E.C.1. Price, 7s. 6d.)

This technical monograph is an acceptable addition to current literature on cold storage insulation, published on behalf of the Institute of Refrigeration. The subject cross-heads indicate the practical range and serviceable nature of this short textbook: thermal conductivity; moisture absorption; heat flow; cellular structures; insulated construction; frost-heave; solar radiation; selection of insulant; precautions with concrete; use of asphalt; airlocks; tables; appendix.

The Shipping Federation

The main question discussed at the six-monthly meeting of the executive council of the Shipping Federation held in London last week, over which the chairman, Mr. D. F. Anderson, presided, was the views of the district committees on the seafarers' current claims for increased pay and alterations in conditions of service. Figures were submitted regarding the progress made with the Merchant Navy Established Service Scheme, the industry's method of providing continuity of employment on a voluntary basis. The number of two-year contracts under the scheme in force at October 31 was as follows:—

	Officers	*Ratings*	*Total*
Company service contracts	20,599	11,098	31,697
General service contracts	2,391	26,847	29,238
	22,990	37,945	60,935

These are the highest figures of contracts achieved since the scheme was instituted 4½ years ago, during the past year the number of ratings under contract having increased by nearly 3,000. During the last six months the substantial increase in the training activities of the industry has been fully maintained and the numbers trained at the 14 schools under the control of the industry were as follows:—

Deck Boys	876
Catering Boys	1,468
Firemen	467
Cooks	187
Efficient Deck Hands	575
Lifeboat Efficiency Certificates	1,108
	4,681

NORWEGIAN SHIPPING AND SHIPBUILDING

FOLLY OF GOVERNMENT INTERFERENCE IN SHIPPING

By THE SHIPPING WORLD'S Own Correspondent

ACCORDING to a statement from the Norwegian Government, Norwegian shipowners have been granted licences to build ships abroad totalling 982,000 tons gross in the first half of 1951. It will be remembered that in the autumn of 1948 the Norwegian authorities started a policy of granting practically no licences to shipowners who wanted to build abroad. This state of affairs lasted until December 1950. The reason for this policy was, according to the authorities, the shortage of foreign exchange. The fact is, however, that many owners were willing to finance the building of tankers abroad by mortgaging their ships already in operation and thus make no inroads whatsoever on scarce exchange.

There can be no doubt that Government officials have had a hard time explaining away the mistake of what has become known as *kontraheringsstoppen* (the licence stoppage); and the fact that the Ministers and better informed members of the Norwegian Socialist Government realised that this policy would not benefit Norway's economy in the long run, but had to undertake the policy against their better judgment, makes it only harder for them to find proper and acceptable excuses. It will go down in Norwegian shipping history as a first-class blunder by the authorities meddling with the affairs of shipowners and mixing home politics into a business which is ruled by world affairs. As such it may serve as an example that should not be copied, however strongly the local politicians exert their influence. As far as Norway is concerned, the words of the present president of the Norwegian Shipowners' Association may be appropriate. He wanted to remind the Government of the policy so that it would not be repeated. That the authorities have changed their mind completely, the above figure of nearly one million tons during the first half of the year is ample proof, and it should be noted that 725,000 tons of this total are tankers. Most of the vessels will be delivered during 1953 and 1954, but some as late as 1956.

Dollar Deficit Decreased

In the meantime the Norwegian exchange position is improving steadily. The overall balance of payments showed a deficit of some Kr.90 mn. after the first six months of this year, and although the figure is not yet available for the first three quarters, it is reckoned that there will be a surplus that will not only wipe out the deficit, but leave a surplus in the region of Kr.100 mn. The position can be judged to a certain extent from the balance in the European Payments Union. During the first ten months of that institution's existence, Norway had a deficit of some $8 mn. monthly. In May last the deficit all of a sudden fell down to minus $0.2 mn. and June figures were balanced with a surplus. July again showed a deficit of some $0.2 mn. For August there was a surplus of $3.7 mn., for September as much as $7.8 mn. and for October $4.5 mn. Thus Norway has now paid back to the Union so much that her debt is only about $4 mn. It is in view of these facts that on November 14 Government officials and representatives of various organisations discussed the extending of the free list system. The talks were of a preliminary nature, and not published, but there is every indication that Norway is heading towards more freedom in her international trade. It is hoped that this will also mean more freedom for the shipowner to order ships when and as many as he likes, although it may be some time before that hope is realised.

The "small ships" group in the Norwegian Shipowners' Association recently held its annual general meeting. According to the report the group has 151 members with a fleet of 263 ships of 2,500 tons gross or below, aggregating 322,464 tons gross. It should be noted, however, that these figures compare with 292 vessels and some 350,000 tons gross a year earlier.

According to Norwegian Veritas the Norwegian merchant fleet aggregated on October 1 last 2,165 vessels of 5,710,000 tons gross, all craft of less than 100 tons gross being excluded. During the first eight months of 1951 foreign yards delivered 40 ships of 360,660 tons gross, while Norwegian yards delivered as many as 40 ships, totalling 51,000 tons gross. This last figure compares with a figure of some 59,000 tons for the whole of 1950. Of the total new tonnage of some 426,000 tons (90 vessels), roughly 327,000 tons were tankers, numbering only 30. The net addition to the fleet is rather small considering the large new fleet; and when during the whole period the net result amounts to 154,000 tons gross it shows quite clearly the effect of the Government policy of leaving it to the owners to finance the outlay of foreign currency for building tankers. No less than 84 ships, totalling 254,200 tons gross, were sold during the eight-months period. This figure included 21 tankers of 130,000 tons.

Selling Continues

The selling seems to continue. No fewer than eleven sales to foreign buyers were reported during October. They included four tankers totalling some 42,000 tons d.w. The other seven are mostly handy-sized cargo vessels totalling some 15,000 tons d.w. only. During the same month eight new contracts were reported; four of them are for tankers with a total deadweight capacity of practically 100,000 tons. Two of the tankers are to be built in Great Britain and two in Sweden. Two cargo liners of about 9,000 tons d.w. have also been ordered in Sweden. During October six vessels and five whalecatchers were delivered to Norwegian owners. All the whalecatchers were delivered by Norwegian yards, as well as a dry-cargo vessel of 4,100 tons d.w., while of the other five cargo ships, all tankers, totalling some 98,000 tons, three came from British yards, one from Sweden and one from the Netherlands.

The Steel Situation

The steel situation as far as Norwegian shipbuilding yards are concerned is becoming serious. As yet there has been no report of stoppages on account of steel, but this may be because the administration of the yards has arranged repair work in such a way that new buildings are postponed for the time being. Practically every possibility has now been tried. Negotiation has even taken place with Japan, as it was hoped to exchange steel for silk cellulose, but it has proved difficult to obtain the cellulose. In any case Japanese steel is a poor substitute for American or European steel, as the measurements of the Japanese plates are smaller than others, which would lead to a rearrangement of all plate measurements and layouts in the plate shops of the yards.

At Kragerö, near Langesund in Southern Norway, the Oslo shipowner, Mr. Ludv. Lorentzen, has bought an old factory situated on a fairly large site. It is Mr. Lorentzen's intention to build a berth on which he will construct hulls and take them in tow to Langesund, where he already owns the Langesunds mek. Verksted, but where there are facilities for building ships of only some 2,500 tons d.w. At Kragerö, ships of up to 5,000 tons d.w. will be built. Construction of the berth will start soon, and of the first hull in the spring of 1952.

COAL AND OIL

THE LATEST RISE IN OIL FUEL PRICES

A NUMBER of reasons have no doubt contributed to the recent decision of the oil companies to raise marine fuel prices in the Eastern Hemisphere still further. Tanker rates remain extremely high, though it must be remembered that the fluctuations in tanker chartering rates affect only a small proportion of the world's tanker tonnage. The rearrangement of tonnage on the world's tanker routes brought about by the shutdown in Persia will certainly have lengthened, on the average, the distance that oil has to be carried from the field before finally reaching its consumer; and the fact that oil is generally in short supply gives no encouragement to the oil companies to absorb any increases in their costs of production and distribution. A comparison of the new prices with the old shows that on the average

CHANGE IN FUEL PRICES

(Spot prices, ex-wharf, excluding taxes, in shillings per long ton)

	BUNKER-FUEL-		DIESEL FUEL	
	New price	*Old price*	*New price*	*Old price*
U.K.-Low Countries	176 0	162 6	243 0	229 6
Las Palmas	160 0	149 0	227 0	216 0
Port Said	172 0	158 0	239 0	225 0
Colombo	167 6	143 6	235 0	210 6
Cape Town	208 0	177 6	276 0	245 0
Singapore	159 0	142 6	276 0	245 0
Fremantle	208 0	177 6	276 0	245 0
Aden	152 6	136 0	219 6	203 0

the increase has been about 14s. Notable exceptions to this are Cape Town and Fremantle, in both of which the increase was 30s. 6d. for bunker oil and 31s. for diesel oil—a considerable amount, representing a rise of 13 per cent. It is noticeable that in all cases the new prices maintain almost exactly the existing differentials between diesel and heavy oil. Over the last twelve months, fuel prices in the Eastern Hemisphere have in general risen by about 30 per cent.

Anglo-Iranian's Wide Scope

AT THE time of the announcement by the Anglo-Iranian Oil Company a few months ago of its decision to maintain its interim dividend for this year, surprise was expressed in some of the financial columns of the Press at this decision. The fact is, of course, that despite its name the company's activities extend through a wide range of countries. This has been emphasised in a statement issued by the company last week, which detailed the extent of its interests outside Persia. Its chief source of crude oil is now Kuwait, where it is an equal partner with Gulf Oil. Production in Kuwait is currently approaching 40 million tons a year, which is higher than that of the Persian wells before the shutdown. Anglo-Iranian is also a 23½ per cent shareholder in the Iraq Petroleum Company, which exploits the old fields of Iraq and Qatar. The company's share from all these interests is at present about 20 million tons annually. In refining, Anglo-Iranian's interests are even more widely spread. Since the end of the war the company has participated fully in the general trend towards the expansion of refinery capacity in centres of consumption, rather than at the oil fields, and this has now paid it well. In Britain, the two refineries at Llandarcy and Grangemouth have a combined annual output of 6¼ million tons, while a further 4 million tons will be available by the end of 1952 from the new refinery being erected on the Isle of Grain. In Europe, the company has interests in refineries at Antwerp and Hamburg (two), at Dunkirk and l'Avera, and at Venice.

Tanker Chartering

IN THEIR weekly tanker market report, John I. Jacobs & Co., Ltd., state the efforts of charterers to arrest the upward movement of rates and introduce a steadier note into the tanker market have met with some success. A number of additional black oil fixtures have been concluded at M.O.T. plus 300 per cent in sterling, and the approximate equivalent of U.S.M.C. plus 180 per cent in dollars, while some charters for several trips are on the basis of a small reduction for the later voyages. Owners prepared to fix sterling tonnage for consecutive voyages in practically any position up to late 1952 for voyages until the end of 1953 find a ready response from charterers, and there can seldom have been a time when charterers were willing to go so far ahead on this basis. According to a report by Lambert Brothers, Ltd., there has been a considerable amount of activity on the part of all the main London charterers, and the demand appears to continue for all types of tonnage. French charterers, after taking a great amount of tonnage, have now come to a virtual full stop on account of France's present economic difficulties, and there is no guarantee that dollar cargoes will be arrangeable as from the beginning of next year. Davies & Newman, Ltd., state that there has been a fair amount of activity on the American market and the latest reported fixtures for single voyages on the U.S. coast are at U.S.M.C. plus 150 per cent for dirty tonnage and plus 177½ per cent for clean tonnage for December loading. Several timecharter fixtures have been effected for American account, and it is reported that two 18,000-tons d.w. newbuildings giving delivery in 1953 have been fixed for seven years at $3.90 for account of American and Canadian principals. E. A. Gibson & Co., Ltd., state that for the first time for many weeks no material change has taken place in freight rates, and with more stabilised conditions ruling, owners have shown greater readiness to operate. Charterers are continuing to do everything possible to induce owners to fix their tonnage on a period basis in an effort to establish a stabilised market, and now that Continental inquiry is less pressing, it would appear rates are more likely to remain steady around their present levels unless there are any unexpected developments.

Shorter Items

IT HAS been reported by Cory Brothers & Co., Ltd., that the price of bunker coal at Monte Video is now 295s. per ton, less 1s. 6d. rebate where applicable (50 tons and under, 2s. 6d. per ton extra).

COAL SHIPMENTS during October from the Port of Blyth, Northumberland, amounted to 599,926 tons. This is the largest quantity shipped in any one month since April, 1937. Coal shipments from the port for the first ten months of this year, at 5,279,402 tons, showed an increase of 86,990 tons on the corresponding total for 1950.

OFFICIAL NOTICES

New Companies

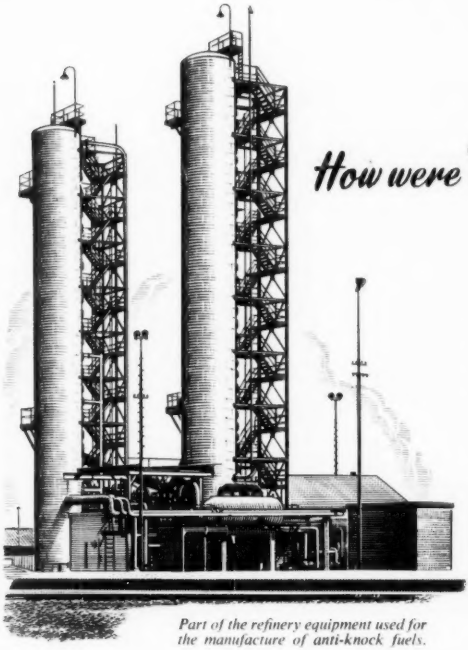
CAMEL LINES, LTD., Plantation House, Fenchurch Street, London, E.C.3.—Registered November 8. To carry on business of ship owners and brokers, etc. Nominal capital: £10,000 in £1 shares. Directors: Not named. Subscribers: U. C. Robinson, Plantation House, Fenchurch Street, London, E.C.3; P. H. North Lewis, 53 Leadenhall Street, London, E.C.3 (solicitor).

A. MOSCHAKIS, LTD., 24 Leadenhall Street, London, E.C.3.—Registered November 7. To carry on the business of ship owners, brokers or agents, etc. Nominal capital: £1,000 in £1 shares. Directors: Not named. Subscribers: A. W. Pears, 6 Colchester Avenue, London, E.12 (clerk); K. H. N. Spookes, 11 Mansfield Road, Ilford, Essex (clerk).

LEADENHALL SHIPPING CO., LTD., 7/13 Creechurch Lane, London, E.C.3.—Registered November 6. Nominal capital: £25,000 in £1 shares. Directors: Not named. Subscribers: P. A. Wood, 4 Stockwell Avenue, London, S.W. 9 (clerk); A. W. Pears, 6 Colchester Avenue, Manor Park, London, E.12 (clerk).

[Information from *Jordan's Daily Register of New Companies*]

INTERESTING FACTS ABOUT OIL



Part of the refinery equipment used for the manufacture of anti-knock fuels.

No. 10.

How were "Anti-Knock" fuels developed?

Study of the characteristics of the less easily detonating fuels led, in the period from about 1920 onwards, to new methods of producing motor spirits. Often the product distilled directly from crude oil had a low anti-knock value, and recourse was then had to "cracking" heavier fractions of the crude by subjecting them to a period of high temperature and pressure, during which chemical changes took place giving a different type of fuel. Blending of the cracked spirit with some of the straight run material from the original spirit produced an acceptable motor fuel for the changed needs of the market.

This and other alterations in refinery technique called for new tests to control quality. The old laboratory methods did not give a satisfactory guide to anti-knock value and special test engines were therefore designed in which all blends were examined to ensure that the requisite quality was reached. Other chemical tests were necessary because the "cracked" spirits, if not suitably refined, could be unstable in storage and form gummy deposits.

Almost at the same time as the use of cracked spirit became general, the research of Midgley and Boyd led to the discovery of the remarkable anti-knock properties of tetra ethyl lead when blended with motor spirit in very small quantities (e.g. 0·5 to 3·6 millilitres per gallon of spirit). In recent years 66,000,000 lb. of tetra ethyl lead were produced annually (in effect, enough to raise 20,000 million gallons of average straight run spirit seven octane numbers in rating).

The present day needs of aviation spirit are the most exacting of all, requiring complicated processes to produce the components for blending. This development was one of the major achievements in the petroleum world from 1939 to 1946 and one in which the Anglo-Iranian Oil Company played a considerable part. The problem is not simplified by the need for fuels with a very low freezing point (not above -60°C.). Further, aviation fuel must be capable of long storage without loss of anti-knock qualities, which excludes any fuel components likely to form gum, combined with the maximum economy at cruising speed and maximum take-off power.

WM CORY & SON LTD GENERAL BUNKER SALES AGENTS

INTERNATIONAL OIL BUNKERING

BP

ANGLO-IRANIAN OIL COMPANY LIMITED

WM CORY & SON LTD., CORY BUILDINGS, FENCHURCH STREET, LONDON, E.C.3

W. Ralston Ltd. *First Class Lounge, M.V. Aureol*

The chairs in the foreground are upholstered in B69 wool upholstery fabric. For the curtains, Old Bleach CJU 144 is used. This is an all-cotton fabric in fast vat colours.

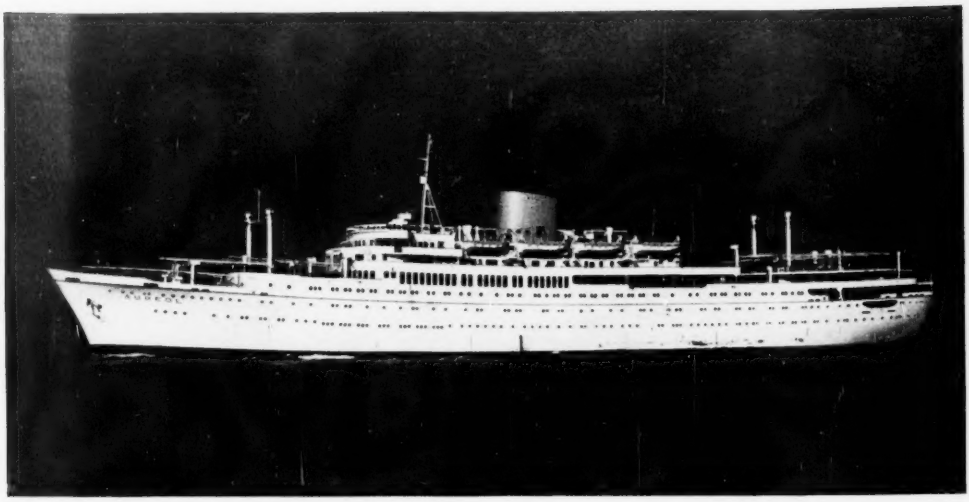
Sea-going furnishings by Old Bleach

You'll find Old Bleach furnishings in the world's most famous liners — in cabin equipment, linen hangings and loose covers, cotton repps and wool upholstery. Leading decorators choose them for their individual beauty of colour and design, their fastness to light, sea-air and washing.

Old Bleach

FURNISHINGS LIMITED *Randalstown, Northern Ireland*

London Showrooms (Trade only): 26 Berners Street, London W.1



PASSENGER MOTORSHIP "AUREOL"

ELDER DEMPSTER LINER FOR WEST AFRICAN SERVICE

THE passenger and cargo liner *Aureol* was delivered recently to Elder Dempster Lines, Ltd., by Alexander Stephen & Sons, Ltd. The *Aureol*, which is the flagship of the Elder Dempster fleet, is now operating in her owners' passenger and mail service between the United Kingdom and West Africa, maintaining this service in conjunction with the *Accra* and *Apapa*, completed in 1947 and 1948 respectively.

The ship has been built under the special survey of Lloyd's Register of Shipping, and conforms fully with the requirements of the 1948 Safety of Life at Sea Convention. Her attractive appearance, which in many ways resembles that of a yacht, strikes a new note in her owners' fleet, as does her colour scheme, with hull painted white. She is notable for the fact that, in addition to her tripod foremast mounted abaft the bridge, she carries a small tripod mainmast at the after end of the midships superstructure. This is no doubt intended partly as a staff from which the ensign may be flown at sea, though it also serves to carry the wireless aerials.

The *Aureol* is a motorship of some 14,000 tons gross, being propelled by Stephen-Doxford engines driving twin shafts. Her leading particulars are as follows:—

Length b.p.	537 ft.
Breadth	70 ft.
Depth	36 ft. 6 in.
Draught	25 ft.
Gross tonnage	14,083 tons
Passengers:	
First-class	253
Cabin-class	100
Service speed	16 knots

As compared with the *Accra* and *Apapa*, the *Aureol* shows a considerable increase in size. The two earlier ships, which were built by Vickers-Armstrongs, Ltd., Barrow-in-Furness, are of 11,600 tons gross. The *Aureol* has 92 feet more length between perpendiculars, 4 ft. more beam, but 6 in. less draught. It may be noted that all three ships have Doxford-type engines developing 9,400 b.h.p. at 118 r.p.m.—in each case constructed by the builders of the ship, and that the service speed in each case is 16 knots. This would appear to suggest that the two earlier ships have greater reserves of power than has been considered necessary for the *Aureol*.

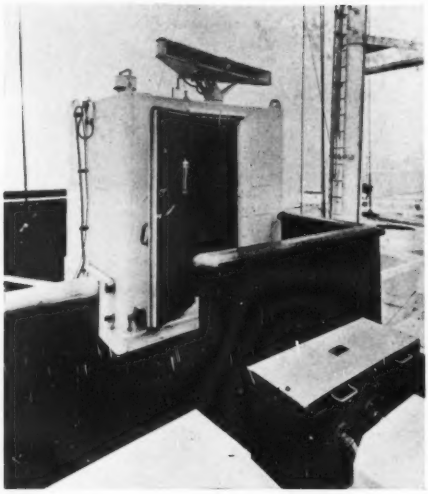
The passenger accommodation in the *Aureol* fully maintains the high standards which are expected of British shipowners, and particular attention has been paid to countering the heat and humidity of the West African climate. Cabins for the 253 first-class passengers are arranged on the upper and bridge decks, and each has either a private bathroom or toilet compartment. In addition to the standard first-class accommodation there are two private cabin suites, situated at the forward end of the upper promenade deck. Each of these consists of a sitting room, day room, and two bathrooms, and has a verandah of its own.

Public Rooms

With the exception of the dining saloon, almost all the first-class public rooms are arranged amidships on the lower promenade deck. They include a lounge, library, card room and smoking room. At the after end of this midships superstructure, but on the deck above, is the first-class swimming pool, which is overlooked by a verandah cafe. Both the first-class and the cabin-class dining saloons are on the main deck, and are served by a common galley and pantry. An attractive feature of the first-class public spaces is the dancing space which has been provided by extending the area normally used for a promenade deck and adding to it the forward end of this deck.

Cabin-class passengers are accommodated in two and three-berth cabins, all of which have outside ventilation, this being provided in some cases on the Bibby principle. Ample bathrooms and toilet accommodation are grouped among the cabins. The cabin-class public rooms occupy the after superstructure on the lower promenade deck, and include a smoke room, library, cocktail bar, lounge and a deck space for dancing right aft.

The changing nature of passenger traffic on the West African route has made necessary in the *Aureol* a greater provision for children than hitherto, and this has been arranged on the boat deck, where there is a dining saloon and play room. The latter opens on to a special play deck, fitted with a guard screen all round and equipped with a shallow paddling pool. The dining saloon, incidentally, shares a pantry with the officers'



The radar cabin, with the scanner mounted on top

dining saloon on the deck below, and this is supplied from the galley by a food lift.

Accommodation for the officers, engineers, electricians and apprentices is arranged on the upper promenade deck, with a common smoke room and mess. With the exception of the two apprentices, all officers have single cabins, and the chief engineer has a suite of rooms comprising day room, bedroom and bath room, with an entrance lobby. The captain has a similar suite on the boat deck above, where there are also the cabins for the purser and his assistant, three clerks and the three radio officers. A special wash place is provided for the engineers when coming off duty, and a lift operates between this deck and the starting platform in the engine room for their use. All three lifts in the ship were supplied by J. & E. Hall, Ltd.

The crew, which is comprised of both Europeans and Africans, has two, three and four-berth cabins. Separate messes are provided for the various sections, served by European and African galleys, and recreation rooms are also provided.

The *Aureol* is equipped throughout the public spaces with Mazda fluorescent lighting, supplied by the British Thomson-Houston Co., Ltd. Fluorescent fittings have been specially designed by the decorative architect, Mr. J. Patrick McBride, of A. McInnes, Gardner & Partners. They are mostly of the cornice type, designed to fit into the sides of shallow deckhead recesses. The visible parts of these fittings are composed of matt nickel-plated frames with hinged glass windows.

In the first-class dining saloon, the deckhead across the full width of the ship is split into three sections, and cornice type 4 ft. fittings are used in the recesses of both side sections. The central rectangular section is lit by bare-lamp fluorescent channels concealed in a cornice, and three inverted mushroom-type fittings mounted centrally, using tungsten lamps, provide a decorative feature. Other decorative tungsten lamp fittings are employed to give added sparkle.

Fluorescent lamps of the colours used on the *Aureol* have already been used on other liners, and have been tested in the B.T.H. laboratories to ensure that there is no distortion in the appearance of food or of the dress and make-up of passengers.

Thermotank Installation

A Thermotank air conditioning, heating and ventilation installation is fitted. The first-class dining saloon and the hairdressing saloons are fully air conditioned, the installation being capable of maintaining comfortable temperatures under the most arduous weather conditions. When heating is required, the installation can maintain in the spaces a temperature of 70 deg. F. when the outside temperature is 30 deg. F. When conditioning is in progress, a proportion of the air from the space being treated is recirculated through the units, but a minimum supply of fresh filtered air equal to 15 cubic feet per minute per occupant is introduced into the system for ventilation purposes. Distributors and punkah louvres are fitted in trunks at ceiling level.

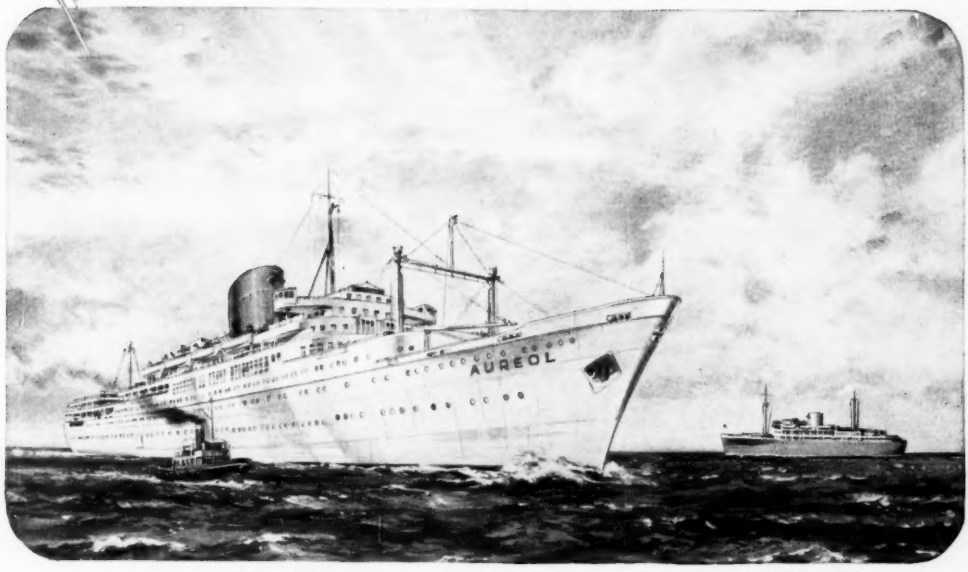
The passengers', officers', engineers' and crew's accommodation is heated and ventilated by the Thermotank punkah louvre system, all to the latest M.O.T. requirements. The general hospital is heated and ventilated. Non-return louvres are fitted, which isolate these spaces should the fan motor be stopped for any reason. The saloon, crew's and native galleys are supplied with

The first-class dining saloon, showing the fluorescent lighting

and NOW

M.V. "AUREOL"

Elder Dempster's New flagship



M.V. "AUREOL" M.V. "APAPA"

Another masterpiece of British shipbuilding sails on her maiden voyage, and like M.V "APAPA" is supplied throughout with

CALTEX

CALTEX

Marine Lubricants

distributed in the United Kingdom by

REGENT OIL COMPANY LTD.

117 PARK STREET, LONDON, W.1

New Elder Dempster luxury liner has Mazda fluorescent lighting

THE NEW 14,000 TON LUXURY LINER AUREOL, built by Alexander Stephens and Sons, Ltd., of Glasgow, set sail on her maiden voyage to West Africa on November 8th.

A fine lighting system is one of the distinctive features of this beautifully appointed ship. Fluorescent lighting has been installed in all her public spaces, Mazda Fluorescent Lamps and Shiplighting Channels forming the basis of the special fittings designed by A. McInnes & Gardner & Partners.

For Leadership in Marine Lighting

Mazda

THE BRITISH THOMSON-HOUSTON CO. LTD.
Crown House, Aldwych, London, W.C.2
(Member of the A.E.I. Group of Companies)

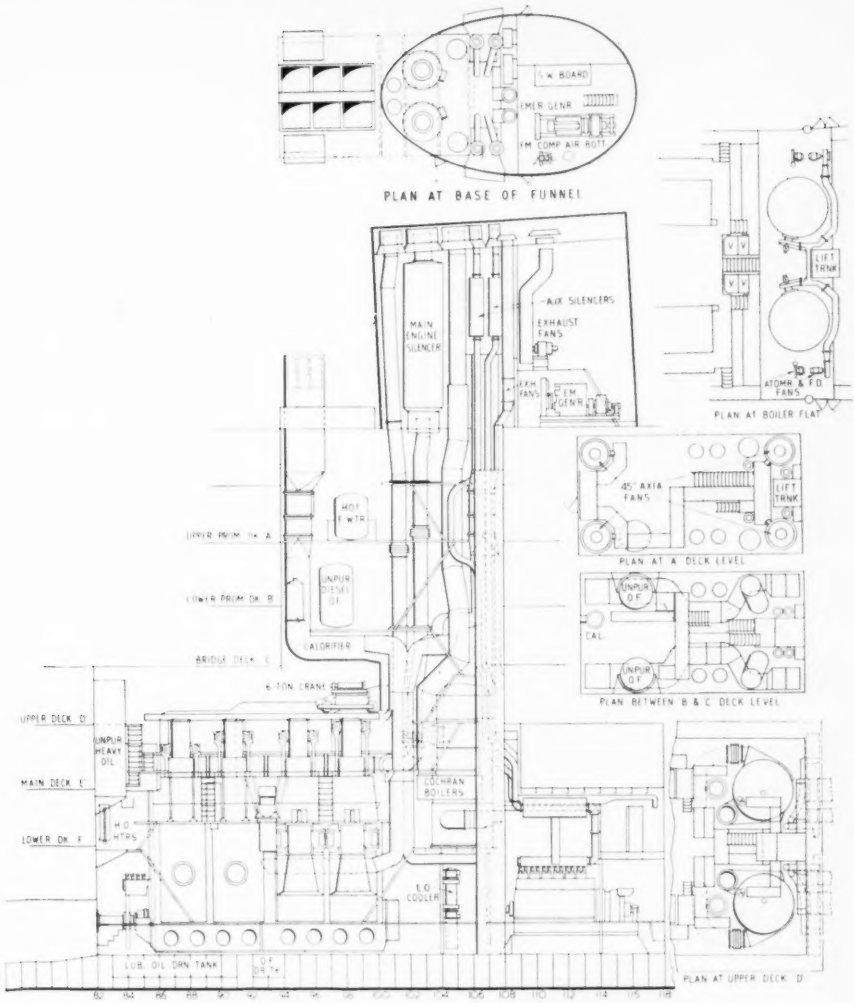
BTH MARINE RADAR

Safety at sea owes much to BTH Marine Radar Equipment which is one of the navigational aids of M.V. Aureol.

BTH Lighting Advisory Service

Specialists in ship and dockside lighting are to be found, along with other front-rank lighting experts, in the BTH Lighting Advisory Service. This service supplies complete plans and specifications whenever these are needed. It is available without charge or obligation from any BTH Office.

B T-H



Elevation of the engine room of the "Aureol," with part plans at various levels

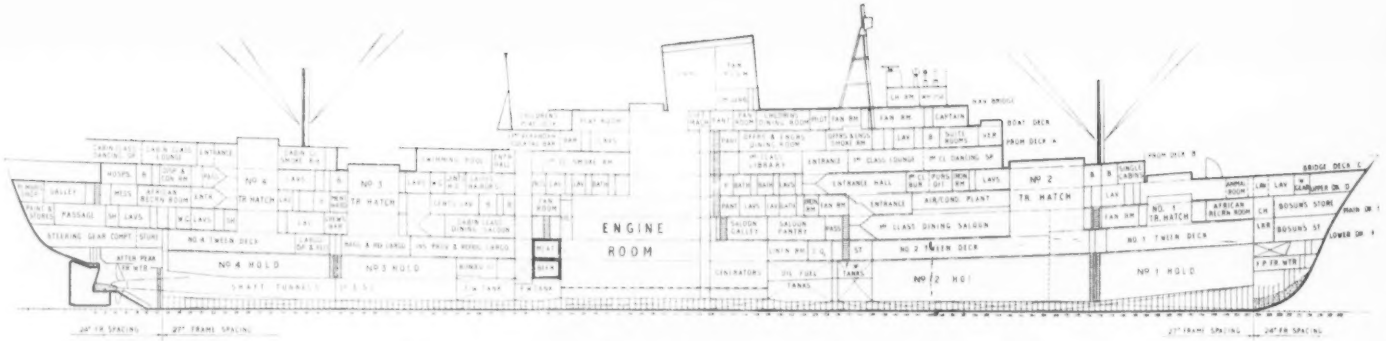
air at atmospheric temperature and also amply exhausted.

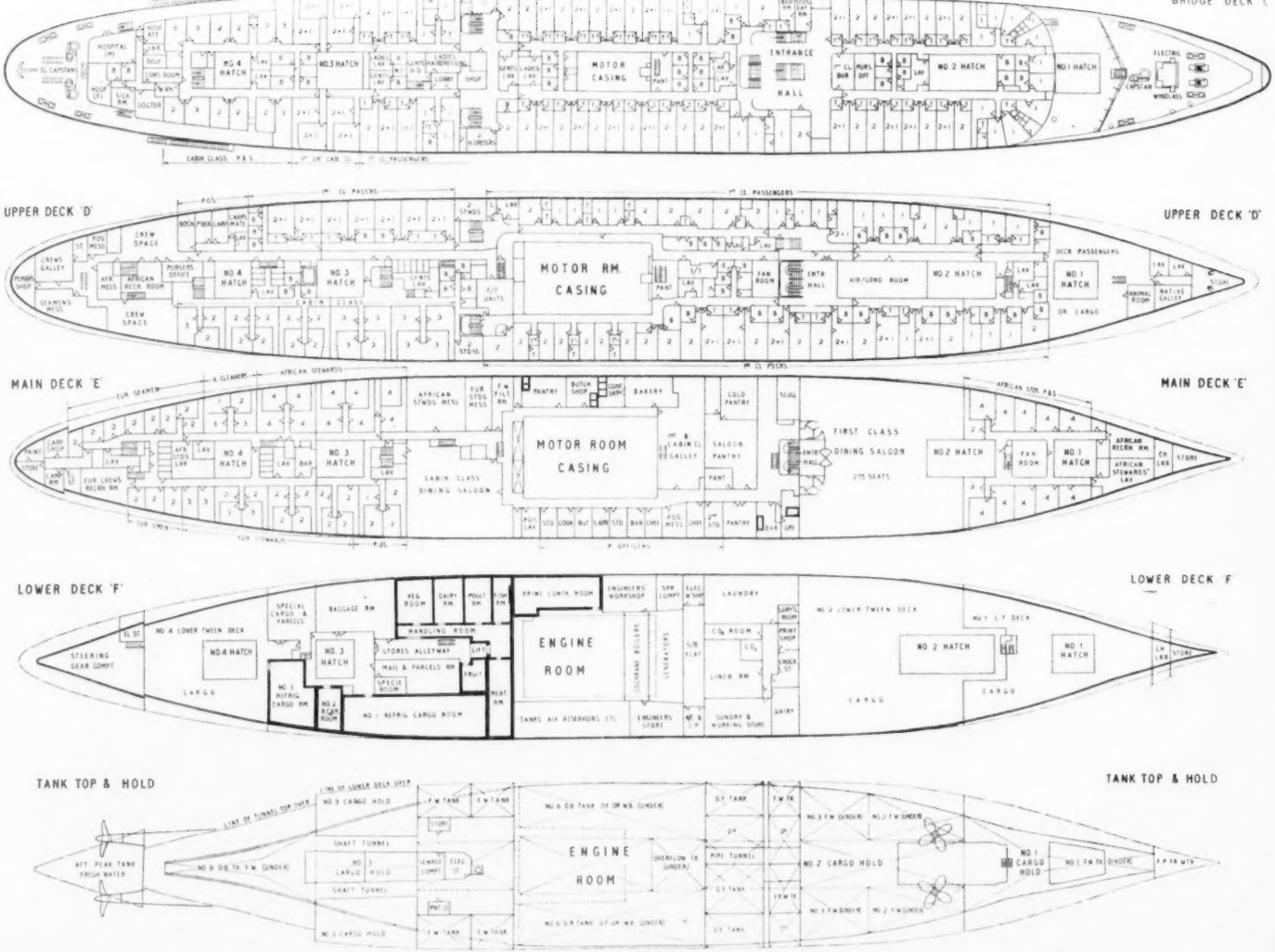
The *Aureol* is fitted with Marconi radio equipment comprising "Oceanspan" and "Reliance" transmitters and "Mercury" and "Electra" receivers. A "Lodestone" direction finder will provide accurate bearings. The radar equipment installed is B.T.H. type RMS 1A, consisting of the two standard B.T.H. assemblies—the radar cabin, with the scanner mounted on the cabin roof, and a display unit. The cabin is on the upper bridge directly above the wheelhouse and chartroom, and the display unit is conveniently placed on the navigating bridge below. The prefabricated radar cabin contains all the necessary equipment except that contained in the display unit. Resiliently mounted on one side are all the power supplies, including the motor-alternator set, power packs, voltage regulator and relay units, together with the local control and contactor panels. On the opposite side is the transmitting and receiving equipment, with the gearbox, scanner motor and Selsyn repeater mounted above. A feature of B.T.H. radar is the comprehensive metering system provided, whereby the operation of all the valves in the equipment can be checked *in situ* under working conditions.

Automatic electric heaters are fitted in the cabin to ensure a higher-than-ambient inside temperature, and so prevent condensation when the equipment is not in operation. Provision is also made for protecting the scanner against icing and snow deposits.

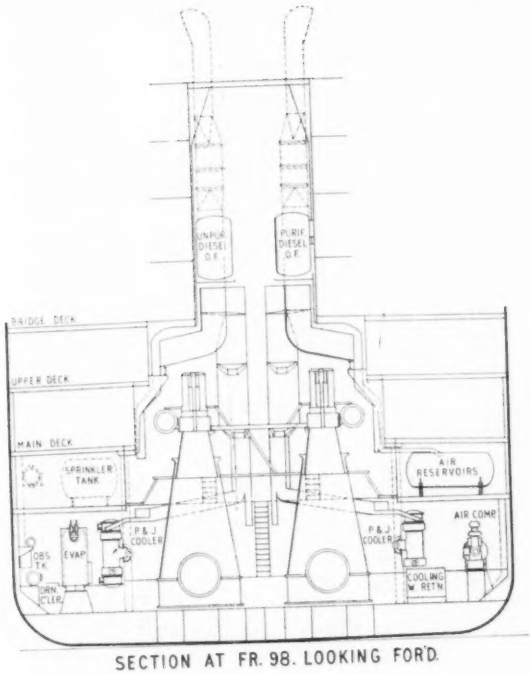
The arrangement of the deck cabin on the *Aureol* is non-standard in that the whole cabin is turned through 180 deg. so that the door opens on the port side. With a rearrangement of hinges, however, the door opens into the wind as in standard installations when it is on the starboard side.

The display unit contains the P.P.I.—a 9 in. cathode-ray tube—with associated power supplies, time bases,

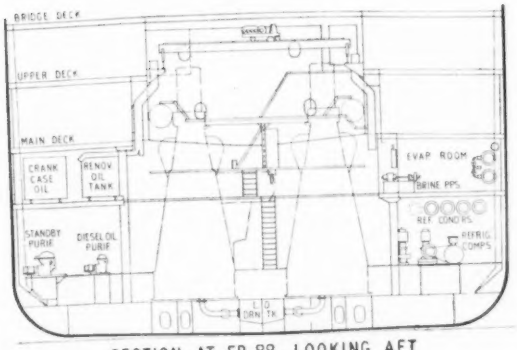

ENGINE ROOM
NO 4 HOLD
NO 3 HOLD
NO 2 HOLD
NO 1 HOLD
NO 4 HATCH
NO 3 HATCH
NO 2 TR HATCH
NO 1 TR HATCH
NO 2 TWEEN DECK
NO 1 TWEEN DECK
BOAT DECK
NAVIGATING BRIDGE
WHEELHOUSE TOP
UPPER PROM. DECK 'A'
LOWER PROM. DECK 'B'
LOWER PROM. DECK B
BRIDGE DECK 'C'
BRIDGE DECK C
MOTOR RM CASING
FIRST CLASS SMOKE ROOM
FIRST CLASS LOUNGE
FIRST CLASS LIBRARY
SWIMMING POOL
MAIN DK
LOWER DK



General arrangement of the passenger liner "Aureol," built for Elder Dempster Lines, Ltd., by Alexander Stephen & Sons, Ltd.

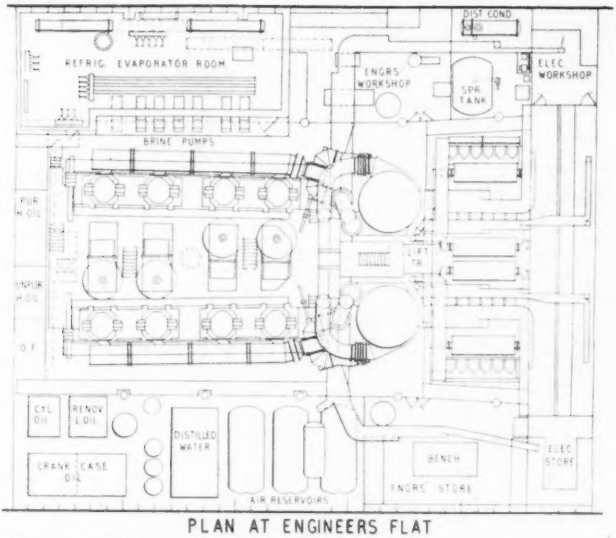


SECTION AT FR. 98. LOOKING FOR'D.

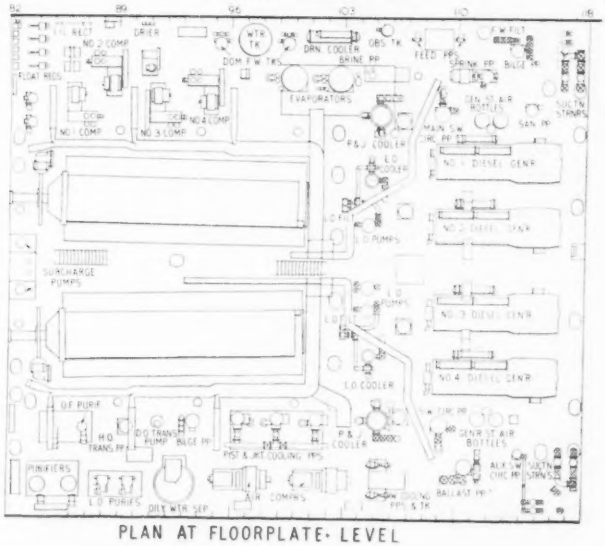


SECTION AT FR. 88, LOOKING AFT

Sections and plans o



PLAN AT ENGINEERS FLAT



PLAN AT FLOORPLATE LEVEL

ns of the engine room of the "Aureol"

and all the necessary controls for operating the complete equipment. Under normal operating conditions it is unnecessary to enter the radar cabin.

The wheelhouse is fitted with Beckett, Laycock & Watkinson's "Duowat" wide vision windows. The outstanding features of these are the speed and ease of operation and the wide field of vision given by the narrow pillars. They are completely watertight. Similar windows were fitted recently in the wheelhouse of the B.I. liner *Kenya*.

There are four cargo holds, two forward and two aft, with one tweendeck throughout. The holds and Nos. 1, 2 and 4 tweendecks are used for the carriage of general cargo. No. 3 tweendeck is refrigerated, and is used partly for refrigerated cargo and partly for the various provision rooms. All the refrigerated chambers are insulated with Fibreglass, and lined with light alloy sheeting on the Gregson system. The three cargo chambers are arranged to carry both meat and fruit, and in one of the rooms the temperature can be maintained at 10 deg. F. The holds are served by fourteen derricks of 5 tons capacity, and two of 10 tons, with electric winches.

Main and Auxiliary Machinery

As stated above, the propelling machinery of the *Aureol* consists of two Stephen-Doxford opposed-piston engines. The engines, which have four cylinders each, are of reversible type and are direct coupled to the two shafts, delivering a total of 9,400 h.p. at 118 r.p.m. The main engines are arranged to burn heavy fuel, which is passed through a clarifier and a purifier of Alfa Laval make. A third Alfa Laval separator is fitted as a stand-by machine, and can be used either as a purifier or a clarifier.

The exhaust gases from the main engines are utilised in two Cochran boilers, arranged for alternate oil firing. Among other auxiliary machinery may be mentioned the two Weir main air compressors, each driven by a 115 h.p. electric motor. A Hamworthy auxiliary compressor is also fitted.

Electricity is generated by four diesel generators by W. H. Allen & Co., Ltd., each of 300 kW. The prime movers are Allen six-cylinder 445 b.h.p. diesel engines, running at 410 r.p.m. The emergency generator consists of an 80 kW generator driven by a 138-b.h.p. diesel engine by the National Gas & Oil Engine Co., Ltd. The switchboard, which is of the deadfront type, is mounted on the forward bulkhead of the engine room, with the four main generators just behind and below it. The emergency generator is mounted in the funnel.

The full list of engine room auxiliary machinery is as follows:—

No.	Equipment	Manufacturer
4	Diesel generator	W. H. Allen
1	Emergency generator	National Gas & Oil Engine Co.
2	Comp. boiler	Cochran
2	Air compressor	Weir
1	Auxiliary compressor	Hamworthy
3	Lubricating oil pump	Stothert & Pitt
3	J. & P. cooling pump	Worthington-Simpson
3	S.W. circ. pump	do.
1	Ballast pump	do.
2	Fuel valve cooling pump	do.
2	Fire and bilge pump	do.
1	Emergency fire and bilge pump	do.
1	Sanitary pump	do.
2	Domestic F.W. pump	Drysdale
1	Heavy oil transfer pump	Stothert & Pitt
2	Boiler feed pump	Weir
2	Lub. oil cooler	Serck
2	J. & P. cooler	Serck
1	Oily water separator	Esplen
2	Fuel burning plant	Clyde fuel
2	Diesel oil purifier	Alfa Laval
2	Lub. oil purifier	Sharples
2	Lub. oil filter	Auto-Klean
2	Fuel oil filter	Auto-Klean
4	Stream line filter	W. H. Allen
4	E.R. ventilating fan	Axia
2	E.R. exhaust fan	Axia
1	Diesel oil transfer pump	Stothert & Pitt
2	Surcharge pump	Stothert & Pitt
1	Heavy purifier	Alfa Laval
1	Heavy oil clarifier	do.
1	Purifier or clarifier	do.

THE Hull office of British Insulated Callender's Cables, Ltd., has been moved to 199 Anlaby Road, Hull. The telephone number remains unchanged (Central 16367).

ROUND THE SHIPYARDS

Work in Progress in Northern Ireland

By THE SHIPPING WORLD'S Own Correspondent

THE NEXT launch from the Belfast yards of Harland & Wolff, Ltd., is expected to be that of the *King Malcolm*, the first of two cargo motorships of 8,300 tons d.w. for the King Line, a subsidiary of the Union-Castle Mail Steamship Co., Ltd., building in the Abercorn yard. This will not complete the output for the year, as a cargo liner of 9,000 tons d.w. building in the Victoria yard for the Ulster Steamship Co., Ltd., is also due to enter the water in December. The total for the year will then be ten vessels of about 120,000 tons.

During the past month an addition to the order book was a cargo motorship of 9,000 tons d.w. for Moltzau & Christensen, of Oslo, who earlier this year took delivery from the Belfast yards of the oil tanker *Orkdal* (12,000 tons d.w.). The latest order is only the second of its kind brought to Belfast from Norway, which has been interested almost exclusively in oil tankers.

Last month Lorentzen's Rederi Co., Oslo, accepted the oil tanker *France Stove*, the last of five ships of 24,000 tons d.w. which Harland & Wolff's have built for these and other Norwegian owners. Another ship recently completed is the *Port Nelson* (8,300 tons), a refrigerated motor vessel with accommodation for twelve passengers for the Port Line, Ltd. With the departure of these vessels, and also of the aircraft carrier *Eagle*, which left at the end of October, there has been a slackening in the fitting-out department, which is now engaged on the Union-Castle liner *Kenya Castle* (17,300 tons) and the cargo liner *Eastern Star* (8,900 tons) for the Australia-China Line, Ltd. Warship construction now consists of the aircraft carriers *Centaur* and *Bulwark*, which are now being given a higher priority.

Restrictions in the supply of steel have also had the effect of slowing down some of the work in the yards, but all the 18 berths are occupied or earmarked for keels. The latest to be laid is that of the oil tanker of 32,000 tons d.w. ordered by the British Tanker Co., Ltd., and a start will be made in December with the passenger liner of 28,000 tons for the Peninsular & Oriental Steam Navigation Co., Ltd. Preparatory work for this vessel is already in hand and the slipway in the Musgrave yard is now ready for the keel-laying ceremony. Ships recently in hand for repairs or overhaul have included the *Ulster Prince*, *Esso Cristobal*, *King Edward* and *Trevaylor*.

ON THE "BALTIC"

(*Continued from page 376*)

from the Continent to the United Kingdom is not showing sign, of developing to a great extent. Operation of aircraft continues to cost more and cheap freight is not available to shippers.

The Airbrokers' Association reminds its members and others who may be interested that valuable lectures are being given on the subject of the commercial air industry at the Merchants Hall, Baltic Exchange. The next lecture will be on December 17 at 6 p.m. and includes a film. The subject will be "Modern Air Traffic Control and its Problems" and the lecturer Captain V. A. M. Hunt, Director, Navigational Services (Control and Navigation), Ministry of Civil Aviation.

Chamber of Shipping Tramp Freight Index

The Chamber of Shipping index number of tramp shipping freights for October 1951 is 190.4, a rise of 23.9 points on the month, the figure for September having been 166.5. It compares with 95.8 for October 1950. The index number is based on tramp fixtures reported during the month, only fixtures in sterling being used.

GAS TURBINE ACHIEVEMENTS

THE MARINE GAS TURBINE PLANT IN 1951

By COMMANDER W. T. SAWYER, U.S.N.*

Four gas turbine engines have seen service afloat to date in six installations. A light, simple, medium-life engine of 2,500 h.p. first went to sea in 1947 in a British naval motor gunboat. Two British 120 h.p. simple engines provided the major propulsive power for the yacht *Torquil* in May, 1950; one of these engines now powers a British naval harbour launch. A 160 h.p. simple engine developed by Boeing for the U.S. Navy powered a naval personnel boat in May, 1950, and became the first gas turbine engine to which vessel propulsion was wholly entrusted; its later version powers a small landing craft undergoing extensive tests for the U.S. Navy. Lastly, but of greatest general significance, a 1,200 h.p. British long-life recuperative engine has just been installed as part of the propulsion plant of the British tanker *Auris*, providing first extensive experience afloat for merchant-type plants.

Ten further marine units have been completed but not installed. Seven are for propulsion and three for auxiliary use. Five of the propulsion and two of the auxiliary units were built for the U.S. Navy. One propulsion and one auxiliary engine were built in England and the final propulsion engine in Switzerland. Six additional engines are under construction for propulsion in the United States, England, and France.

THE FOLLOWING definition is advanced: "A gas turbine engine is a prime mover operating on a substantially steady-flow Brayton or approximate Ericsson cycle, the compression and expansion portions of which are carried out in rotating components." Addition of the word "engine" makes clear that a prime mover, and not merely a mechanical component thereof, is indicated. The complete term "gas turbine engine" also may imply properly that the compressor, combustion chamber, and heat exchanger designers, with their entirely different concepts, are also essential members of the engine-building team. The use of the simple term "gas turbine" has contributed to the unfortunate assumption that steam turbine design principles and experience are adequate for and can be applied with unmixed blessings to the evolution of gas turbine engines.

It is desirable to suggest in passing a standardisation of other terminology which is often a source of confusion. In describing the operation of gas turbine engines or of their turbo components, the significant ratio of upper to lower pressure levels is referred to properly as "pressure ratio." The consistent and familiar use of the term "compression ratio" in relation to reciprocating machinery to define a ratio of measurable volumes before and after compression makes it unnecessarily confusing if applied to the steady flow gas turbine engine for which only pressures are measurable.

Increasingly frequent reference to the type of heat exchanger in which suitable material (such as wire mesh) is exposed alternately to the hot and cold gas streams to effect heat transfer can be expected. Terminology which will distinguish readily between this type of exchanger and the commonly used tubular or extended-surface type, in which the gases always flow on opposite sides of the elements, is needed. Adoption of the British convention which terms the former of the foregoing types a "regenerator" and the latter a "recuperator" is recommended.

One of the most useful and interesting characteristics of the gas turbine engine is its versatility. This versatility is the result of an important additional "degree of freedom," that of ability to take full advantage of variable life requirements. It must be accepted that no startling improvement in steam turbine plant or diesel engine efficiency could be obtained readily by a reduction in required operating life from, say, 100,000 hours to 500 hours. Reduction in design life for the gas turbine engine, on the other hand, permits the material reduction of both specific fuel consumption and weight.

* Abstracted from the paper by this author given before the American Society of Naval Architects and Marine Engineers in New York, November 15 and 16.

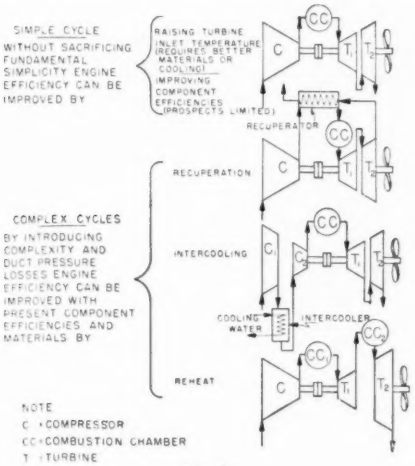

SIMPLE CYCLE
WITHOUT SACRIFICING FUNDAMENTAL SIMPLICITY ENGINE EFFICIENCY CAN BE IMPROVED BY
RAISING TURBINE INLET TEMPERATURE (REQUIRES BETTER MATERIALS OR COOLING)
IMPROVING COMPONENT EFFICIENCIES (PROSPECTS LIMITED)
RECUPERATOR
COMPLEX CYCLES
BY INTRODUCING COMPLEXITY AND DUCT PRESSURE LOSSES ENGINE EFFICIENCY CAN BE IMPROVED WITH PRESENT COMPONENT EFFICIENCIES AND MATERIALS BY
RECUPERATION
INTERCOOLING
COOLING WATER
INTERCOOLER
REHEAT
NOTE
C = COMPRESSOR
CC = COMBUSTION CHAMBER
T = TURBINE

Fig. 1

Decreasing ambient temperature significantly increase both available power and overall efficiency of the gas turbine engine. For example, each 10 deg. F. drop in ambient temperature below design value results in approximately a 5 per cent increase in available power and a 3 per cent increase in overall efficiency for a typical simple-cycle engine. It cannot be overemphasised that a stated figure for gas turbine engine power rating or efficiency represents only an approximate description unless clearly associated with a definite ambient temperature. A standard ambient condition of 80 deg. F. (sea level) is used by the Bureau of Ships.

Fig. 1 shows the starting point, or simplest cycle, to consist of compressor, combustion chamber, and turbine. Taking values established by actual production practice for turbine, compressor, and combustion chamber efficiencies, and assuming aerodynamic losses held to a minimum as they are in a straight-through flow arrangement, attainable engine efficiency is a function only of top cycle temperature (for given standard ambient conditions). This temperature is limited clearly by the stress-to-rupture and creep properties of available materials. Representative of the modern simple-cycle machine is a 4,800-h.p. locomotive unit which weighs about 5 lb. per h.p., has a specific volume of 0.20 cu. ft. per h.p., and an overall thermal efficiency of 18 per cent burning bunker C fuel oil. The same basic engine type has been modified for other applications requiring widely variable output speed by providing a separate power-output turbine. This modification effects no change in full-load specific fuel consumption, but improves part-load economy at the expense of about a 10 per cent increase in specific volume.

Simple-Cycle Unit in Service

Increasing numbers of units of the foregoing general type are entering industrial service in the range from 1,000 to 6,000 h.p. They fail to match either the full-load or, more notably, the part-load efficiency of the diesel engine. Referring again to Fig. 1, it is noted that two devices are available for improvement of fuel economy without obvious change in plant simplicity. There are increase in maximum temperature and improvement of turbine and compressor efficiencies. Increase in top cycle temperature requires the development either of higher-temperature materials or of cooling techniques. Improvement in component efficiencies is the other alternative, and in this direction progress certainly will be made with the passage of time.

Immediately available devices for improving engine thermal efficiency, using present materials and component efficiencies, all involve additional complication. Other cycles, such as the Sulzer "semi-closed" and Escher Wyss "closed" cycles, and thermodynamically combined steam-gas and diesel-gas cycles are evolved in this way. To improve the simple open-cycle efficiency, heat exchangers may be incor-

porated. The improvement in efficiency is offset somewhat by a reduction in power due to the pressure drops introduced. Typical of several shore recuperative gas turbine engines commercially available is that produced by the General Electric Company. It delivers 5,000 h.p. at a thermal efficiency of 23.7 per cent and shows a specific weight of about 56 lb. per h.p. (of which 50 lb. per h.p. is recuperator) in a specific volume of about 1 cu. ft. per h.p. (of which 0.8 cu. ft. per h.p. is recuperator). Part-load efficiency is proportionately more improved than full-load efficiency.

The second practical recourse for improvement of plant efficiency is the incorporation of intercoolers in the compression process. Introduction of a properly designed intercooler may result in an increase in both plant efficiency and power, particularly the latter.

The third alternative for increasing gas turbine plant efficiency at the expense of added complexity is reheat of the expanding gases in an additional combustion chamber. Reheating is familiar, under another name, in a special type of gas turbine engine—as "afterburning" in the aircraft gas turbo-jet engine. It was incorporated, along with intercooling and recuperation, in the experimental plant built by the Elliott Company for the U.S. Navy in 1945. That unit, which incorporated all three possible complexities, had a test thermal efficiency of 27.6 per cent, a specific weight of 30 lb. per h.p., and a specific volume of 5 cu. ft. per h.p.

Were the marine gas turbine plant to have a free choice of fuels, it might be stated fairly that its reliability is equal to that of its steam or diesel competitors. Bunker C fuel, with some attention given to source, has been burned during very extensive operation of the Alco-G. E. gas turbine locomotive in 100,000 miles of revenue service on the Union Pacific Railroad during the past two years. Ten oil-burning plants totalling 66,000 kW capacity sold by the Swiss firm of Brown Boveri had compiled 44,135 hours in revenue service in seven countries at the end of July 1951. Of these, the pioneer locomotive plant of 1941 continues in scheduled service after ten years and 300,000 miles of operation. Evidence accumulated from actual service justifies the statement that reliability of simple-cycle long-life gas turbine engines of about 18 per cent efficiency has been established as the equal of that of steam or diesel power for operation of the type required in merchant ship propulsion when supplied with diesel or selected residual fuel oil.

Fuel Costs

Modern steam propulsion plants of 12,500-16,000 s.h.p. have shown a fuel consumption (bunker C fuel) of about 0.50 lb. per s.h.p.-hour. The specific fuel rate, by test, of a recuperative 1,200-h.p. gas turbine propulsion plant now

TABLE 1.—WORLDWIDE PRICES OF MARINE FUEL OILS JUNE 1951

Area	Cost ratio: Diesel / Bunker C — Volume basis	Weight basis
Africa	1.40	1.64
Australia-New Zealand	1.34	1.57
Caribbean	1.59	1.86
Eastern Asia	1.40	1.64
Indian Ocean	1.50	1.76
Middle East	1.44	1.69
South America	1.14	1.33
Western Europe and Mediterranean	1.37	1.61
East Coast, U.S.A.	1.59	1.86
West Coast, U.S.A.	2.02	2.36
Gulf of Mexico	1.91	2.24
Approximate U.S.A. average	1.8	2.1
Approximate world average	1.5	1.7

Note: Diesel, 7.64 barrels per ton. Bunker C: 6.52 barrels per ton.

Volume per unit weight ratio: 321 gallons per ton (Diesel) / 274 gallons per ton (bunker C)

installed on board ship, is 0.66 lb. per s.h.p.-hour. Since, however, similar stationary plants of higher (2,500-13,500 h.p.) powers have shown in service fuel rates from 0.63 to 0.48 lb. per s.h.p.-hour (the experimental marine plant tested by the Elliott Company for the United States Navy in 1945 gave 0.47 lb. per s.h.p.-hour on diesel fuel), the value of 0.55 lb. per s.h.p.-hour will be taken as the established value for a comparative present-day 12,500-h.p. complex-cycle gas turbine plant. The fuel rate for the long-life simple-cycle gas turbine plant in the 12,500-h.p. range is well established at 0.8 lb. per s.h.p.-hour. A representative figure for modern marine diesel engine specific fuel consumption (diesel oil) is considered to be 0.36 lb. per s.h.p.-hour. If the average worldwide ratio of diesel to bunker C fuel-oil costs (weight basis) is taken as 1.7 (the ratio varies widely with locality, as shown by Table 1), fuel costs may be readily compared. Since the gas turbine plant has still to demonstrate its ability to burn bunker C fuel unrestricted as to source, both diesel and bunker C fuels are shown. Although the diesel engine has demonstrated its practical ability to burn residual oils in marine propulsion service, engines of this type burning distillate fuel still predominate. Accordingly, both diesel oil and bunker C figures are also shown for the diesel.

Table 2 shows the relative fuel costs per h.p.-hour for four types of marine machinery, with steam plant as the basis for comparison. When the diesel engine is adapted to

TABLE 2.—COMPARATIVE FUEL COSTS OF 12,500 H.P. MARINE PRIME MOVERS

Type engine	Assumed S.F.C.: (lb. per h.p.-hr.) Bunker C oil	Diesel oil	Fuel cost per h.p.-hr relative to steam: Bunker C oil	Diesel oil
Diesel	0.38	0.36	0.76	1.22 (1.51)*
Steam	0.50	—	1.0	—
Simple gas turbine	0.80	0.755	1.60	2.56 (3.17)*
Complex gas turbine	0.55	0.52	1.10	1.77 (2.18)*

Tabular values are based upon:

1. Average worldwide cost ratio $\frac{\text{Diesel}}{\text{Bunker C}}$ (weight basis) = 1.7 (see Table 1).
2. Higher heating values, B.T.U. per lb.: Bunker C = 18,500; Diesel = 19,600.

* Values in parentheses apply to U.S. ports.

$\left(\text{cost ratio: } \frac{\text{Diesel}}{\text{Bunker C}} = 2.1\right)$

burn bunker C fuel, its fuel requirements can be met 24 per cent more cheaply than its nearest competitor. The fuel cost for the conventional diesel engine, burning diesel oil, is 22 per cent greater than that of the steam plant; that of the complex-cycle gas turbine plant is 10 per cent greater when burning selected bunker C, and 77 per cent greater when burning diesel oil, than that of the steam plant; that of the simple-cycle gas turbine plant is 60 per cent greater when burning selected bunker C and 156 per cent greater when burning diesel oil than that of the steam plant. The variation in cost of fuel handling between bunker and diesel oil on board ship and the much greater consumption of lubricating oil (42 times) by the diesel in relation to either steam or gas turbine plants have been omitted as secondary variables.

First Cost

Inquiries to a leading American manufacturer of both land steam turbine-generator equipment and complete gas turbine engine-generator units, and to a leading firm of commercial engineering consultants, established the following approximate costs for land prime movers:

	Cost per horsepower
5,000 h.p. simple-cycle, variable-speed gas turbine engine	$ 70
5,000 h.p. recuperative variable-speed gas turbine engine	$ 90
7,000 h.p. recuperative-intercooled gas turbine engine	$110
17,000 h.p. recuperative constant-speed gas turbine engine	$ 77
5,000 h.p. steam boiler-turbine plant	$ 85
5,000 h.p. diesel plant	$110

Table 3 shows the approximate cost of land power station gas turbine engines offered by a leading foreign manufacturer. Import duties and shipment charges to this country have a bearing upon the price differential between this and American equipment. All equipment shown in Table 3

TABLE 3.—PRICE QUOTATIONS (SWISS MANUFACTURER) FOR GAS TURBINE ENGINE EQUIPMENT LAID DOWN IN U.S.A. (Duty paid)

Gas turbine engine type	Without recuperator: Horsepower rating at 68° F. ambient	Price per horsepower	With 75 per cent recuperator: Horsepower rating at 68° F. ambient	Price per horsepower
A	1,770	$164	1,675	$214
B	2,380	132	2,220	178
C	3,200	113	3,030	161
D	4,400	93	4,050	143
E	5,700	90	5,300	140
F	7,400	77	6,800	128
G	10,000	82	9,400	125
H	14,000	73	13,400	113
I	18,000	69	17,400	104

Notes:

1. All engines have essentially constant-speed output for electric power generation, and are complete up to what would normally be the generator coupling.
2. Price quotations include reduction gear to deliver power rating at 3,600 r.p.m., except in case of Type F, which drives directly at 3,600 r.p.m.
3. All types except Type I are single-shaft.
4. Type I is a 2-shaft arrangement with 2 compressors, intercooler, 2 combustion chambers and 2 turbines.
5. Type H has 2 compressors on single shaft, with intercooler. With addition of a separate power-output turbine, this unit would be potentially well suited to marine propulsion.

operates at a maximum gas temperature of about 1,110 deg. F., which makes its reliable operation on bunker C fuel unrestricted as to source much more likely, but increases plant specific volume and hence cost relative to plants operating at higher temperatures.

The exact comparison of propulsion plant first cost requires, of course, consideration of cost differentials of other machinery required to transmit the power developed to the propeller at the proper speed and direction of rotation and

to furnish essential shipboard services in conjunction with the main plant. Reduction of gas turbine plant output rotational speed to that required for either a fixed or variable-pitch propeller may be accomplished by the same gearing in present use for steam plants. To achieve reversal, suitable clutches or brakes, together with idler pinions, may be introduced into the gear system, or the variable-pitch propeller may be adopted, either alternative at an increase in cost (and reduction in reliability).

In a report to a national meeting of the Edison Electric Institute in Oklahoma City on May 7, 1951, Mr. G. D. Conley, chief engineer, Oklahoma Gas and Electric Company, stated: "On May 1, 1951, this General Electric gas turbine has been in operation 20 months. Little maintenance has been necessary on the unit and all work has been done by regular plant forces. As is standard company practice for new steam turbines, an overhaul and inspection was scheduled to be done after about 6 months of operation. In the future it is planned to put the unit on the same three-year basis as is used for the steam turbine units."

Mr. J. W. Blake, assistant superintendent of generation, Oklahoma Gas and Electric Company, reported the following details of maintenance requirements in a paper presented earlier, on November 30, 1950: "The initial six-month overhaul and inspection was more extensive than normally will be made in the future. It was felt justified owing to the newness of the design, together with lack of experience in operation. A total time of 44 days was taken and the expense was $7,017. Little material was found necessary, the majority of the expense being labour. It is estimated that subsequent inspections can be made in about a 14-day period and at a cost of around $3,000 to $4,500, depending on materials required. Being done on a 3-year basis, this would be at a rate of $1,000 or $1,500 per year."

The ability of the gas turbine plant in general to deliver unidirectional shaft power to meet rapid changes of load is well established. Skortz and Gessner have reported tests to show that a very early parallel-cycle, recuperative marine plant could very acceptably match a typical destroyer acceleration pattern over a three-hour period with but slightly trained operators. Manœuvrability, as regards both unidirectional load variation and starting time, is clearly acceptable for normal marine propulsion service. Marine propulsion, however, requires a reversal of propulsive thrust. Effective transmission systems to permit the gas turbine engine to fulfil this requirement have been demonstrated in actual sea service with gas turbine engines only for very low powers (120 to 160 h.p.). Mechanical reverse gears were used in these instances. Detail discussion of the alternative provisions for reversing has been given by Hammond and others. Included are clutches (friction and hydraulic), epicyclic reduction gears with reversible elements, controllable-pitch propellers, and electric drive. Provision of a separate gas turbine for astern power, as is common practice with steam turbines, is thoroughly impractical. Of the immediately available alternatives, the writer favours use of clutches and a reversing gear with an otherwise conventional reduction gear and fixed-blade propeller, or use of a controllable- and reversible-pitch propeller.

TABLE 4.—WEIGHT COMPARISON OF VARIOUS TYPES OF MERCHANT SHIP PROPULSION MACHINERY

	Diesel: modern direct-coupled	Steam (600 p.s.i. : 850° F.)			Gas turbine
Type			*Pennsylvania*	*Typica*	
Horsepower	(Brown) 6,600	Venore 13,000	12,500	modern (Brown) 10,000	Pamerada (Brown) 10,000
			Weights tons		
Turbines	—	39.1	37.6	21	25
Main condenser	—	19.0	22.5	23	—
Reduction gear	—	97.0	95.1	66	60
Boilers, including forced-draft system	—	215.2	169.9	180	17 (CC)
Compressors	—	—	—	—	16
Recuperator	—	—	—	—	46
Intercooler	—	—	—	—	11
Ducting	—	—	—	—	28
Bedplates	—	—	—	—	17
Total, main machinery	404	370.3	325.1	290	220
Specific weight main machinery, lb. per s.h.p.	137.3	63.8	58.3	65	49
Auxiliary generators and switchboards	140	24.9	26.9	190	190
Auxiliary machinery (for propulsion)		78.1	85.8		
Floors, ladders, gratings		41.1	41.1		
Stacks and uptakes		25.9	19.4		
Tanks		7.3	7.1		
Fuel system		18.3	18.4		
Steam, exhaust and air piping	160	34.4	34.4	250	210
Water piping and sea connections		64.4	52.2		
Lubricating-oil piping		9.7	9.7		
Lagging		27.2	27.2		
Tools, gauges, operating, and lifting gear		14.8	14.7		
Liquids in system	30	52.0	64.0	50	20
Total wet weight up to propeller shaft coupling	734	768.4	726.0	780	640
Specific total weight up to propeller shaft coupling: lb. per s.h.p.	249.0	132.5	130.1	175	143

It is interesting to note the situation with regard to weight. The significant comparison is made in Table 4 based, to the maximum extent possible, upon actual marine installations. Based upon a 3,500-h.p. plant designed in 1946 and actually constructed by Pametrada in 1950, at present under test prior to eventual marine installation, Brown has made a detailed layout and weight analysis of a 10,000-s.h.p. gas turbine plant. This study, of 1949-50 vintage, is both conservative and authoritative and is used, therefore, to represent today's complex-cycle marine gas turbine plant.

It will be noted in Table 4 that specific weights of main components alone show the diesel 120 per cent heavier than steam, and the gas turbine plant 20 per cent lighter than steam. On a total plant basis, taking the American steam vessels as the base line, the diesel is 90 per cent heavier than steam, and the gas turbine plant 8 per cent heavier than steam. The latter conclusion from the given facts is open to serious question. The writer agrees in general with Brown's conclusion (comparing columns 4 and 5) that the specific weight of the complex-cycle gas turbine plant installation available today is about 10-20 per cent lighter than a 600-lb., 850 deg. F. steam installation.

Ultimate evaluation of comparative weights of different types of machinery requires recognition of their fuel requirements. The proper index of "weight for propulsion" is the specific weight of machinery installation plus fuel, and is a function of required steaming time between fuelings, or cruising radius. Table 5 shows this comparison for trans-

TABLE 5.—TOTAL PROPULSION SPECIFIC WEIGHT FOR MODERN MARINE PRIME MOVERS

	Steam	Diesel	Complex-cycle gas turbine
Wm	130	250	115
s.f.c.	0.50	0.38	0.55
Wt: t = 250 hours	255	345	252
Wt: t = 500 hours	380	440	390

Wt = Wm + t × s.f.c.

where:

Wt = total propulsion specific weight (hours); lb. per s.h.p.
Wm = specific weight of propulsion machinery installation; lb. per s.h.p.
t = steaming time between fuelings; hours.
s.f.c. = specific fuel consumption of propulsion machinery; lb. per s.h.p.-hr.

atlantic (250 hours) and the United States-Persian Gulf (500 hours) traffic. Were weight critical, it would be difficult to make a case for the diesel.

The tonnage laws governing merchant vessels constitute at the moment a persuasive deterrent to any active effort to realise a compact machinery plant. Roberson reports that "Welsh has investigated this point in relation to a 10,000-tons ship with a net tonnage of 6,250. Reducing the size of the engine room from 13 to 12 per cent might increase the hold capacity from 815,000 to 825,000 cu. ft., an increase of 1.25 per cent, but would increase the tonnage dues by 32 per cent. This would pay only so long as the revenue from the increased cargo space exceeded the extra expenditure on tonnage dues and this could only happen if the tonnage dues never exceed 4 per cent of the gross earnings. If the engine room were decreased to 6.5 per cent of the whole volume, the hold capacity would be increased by 8 per cent and the tonnage dues by 41 per cent. This would show an increase in revenue so long as the tonnage dues did not exceed 19.5 per cent of the gross earnings.

Conclusions on Comparative Volumes

Brown's figures appear to establish that required engine-room lengths are about equal for steam and for complex gas turbine plants, and that both are about 20 per cent shorter than the diesel engine room. The volume comparison can be concluded on this basis: the steam, diesel, and complex-cycle gas turbine plants require volumes which are not significantly different, and all comfortably fit the volume normally made available as a result of revenue considerations as affected by tonnage rules. In the event that tonnage rules undergo revision, and in certain special-service vessels under present rules, the use of simple-cycle gas turbine engines would afford the opportunity for reducing engineroom volume to about the same extent that recent gas turbine engined locomotives have reduced lengths in comparison to steam- or diesel-powered locomotives, or about 30-50 per cent.

From the foregoing considerations of reliability, fuel cost, equipment first cost, maintenance and operating personnel requirements, manœuvrability, specific weight, and specific volume, it appears that limited incentive exists for shipowners to consider, at the present time, gas turbine propulsion plant rather than available steam or diesel plants.

There is good reason to believe that accumulation of sea experience with a gas turbine plant will produce the missing incentive, for there is ample evidence from other types of service to give reasonable assurance of improved reliability, reduced maintenance and operating personnel requirements, and improved manœuvrability. Only in specialised applications where machinery weight and space are at a premium and where fuel economy can profitably be subordinated to quick starting, low maintenance, and minimum operating personnel, does the simple-cycle gas turbine engine already hold a clear margin of established superiority over its competitors. Uncertainty as to the ability of the gas turbine engine to burn satisfactorily residual fuel oils from whatever source is a deterrent to its marine propulsion application, second in importance only to the absence of actual experience in marine service.

First Gas Turbine Vessel Crosses Atlantic

From Port Arthur, Texas, has come the news that the Shell tanker *Auris*, the first ocean-going ship in the world to be driven by a gas turbine, arrived there on November 19. She left the River Tyne on October 28. The distance of 4,905 miles was made at an average speed of 9.21 knots, including six days of continuous heavy weather when the speed of this normally 12-knots ship was on occasions reduced to 7 knots. The B.T.H. gas turbine ran continuously in conjunction with the three remaining diesel engines throughout the 21-days voyage, it not being found necessary to stop or even reduce the rotor speed for any reason whatsoever, while operating conditions varied only to the extent expected when the atmospheric temperature rises from 52 to 81 deg. F.

RECENT PUBLICATIONS

The story of the port of Portland, Maine, is the subject of an interesting article in the current issue of the *Ships' Bulletin*, published by the Esso Shipping Company, New York.

A Directory of General Exporters in the Netherlands has been published by the Commercial Intelligence Office (Bureau Voor Handelsinglichtingen), Oudebrugsteeg 16, Amsterdam C. (price, $2.50). It also gives addresses of buying agents for foreign firms, and is complete with Dutch-English and English-Dutch vocabularies.

The current issue of *Via Port of New York*, circulated by the Port of New York Authority, contains a brief history of the Brocklebank Line. It is stated that the names of the first four ships built by Daniel Brocklebank (before the *Castor*) are unknown, and the chairman of Thos. & Jno. Brocklebank, Ltd., would welcome additional help in tracing these names.

An article entitled "Barrow, West Coast Iron Ore Port," in the current issue of *Lock and Quay*, organ of the Docks & Inland Waterways Executive, state that two of the principal ore discharging berths will each be provided with an additional 10-tons electric grabbing, slewing and luffing crane as a result of a newly authorised scheme. Each berth at present is equipped with two such cranes.

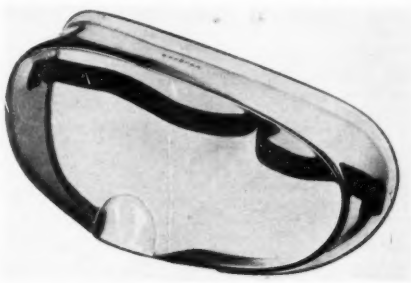
An article entitled "The Control of Cracking in the Metal Arc Welding of High Tensile Structural Steel" appeared in the August issue of *Welding Research*, organ of the British Welding Research Association. It describes an investigation in which it was found that a critical cooling rate existed for each type of electrode used, and when this rate was exceeded hard zone cracking occurred. Mention is also made of a new weldability test which can be made on plates of various thicknesses to give different grades of severity. This test, called the Controlled Thermal Severity (C.T.S.) test, can be used to assess the weldability of a steel, to determine the suitability of an electrode, or to simulate conditions in a given structural joint.

The report of the specialist team on Education for Management appointed by the Anglo-American Council on Productivity is now available (price 4s. 6d.) from 21 Tothill Street, London, S.W.1. The team believes American experience to have shown that productivity and education for management are closely related. The subject is of such vital importance to Britain that industry as a whole should study means for promoting educational experiments for executive development; individual firms should review their training programmes in the light of American experience, and education authorities should consider how they can best encourage and develop administrative studies.

RECENT TECHNICAL DEVELOPMENTS

New Type of Safety Goggles

Industrial eyeshields which give complete protection without discomfort to the bridge of the nose or the ears have been introduced by J. & S. Newman, Ltd., of 100 Hampstead Road, London, N.W.1. The eyeshield, under the trade name "Safespex," offers completely unsplinterable and ventilated goggles, toned to individual industrial and institutional requirements, e.g., green for welding, red for X-ray work, grey/blue for sun glare and clear for general use, all giving



The "Safespex" industrial eyeshield

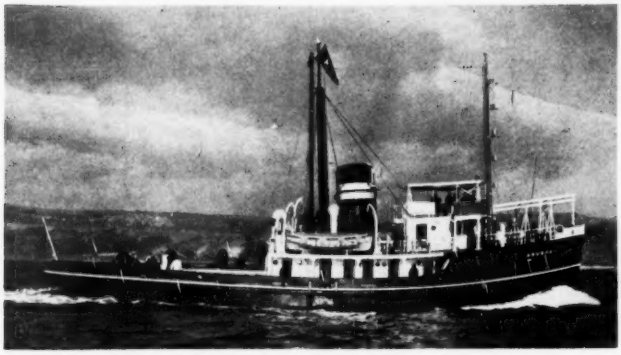
an unrestricted field of vision. The wearer of spectacles has no difficulty in placing "Safespex" over them. The "Safespex" eyeshield rests only on the cheekbones and the forehead, thus avoiding any discomfort to the nose or ears, an elastic band holding these lightweight goggles easily in place. Wherever vision is in danger or under stress, "Safespex" should be a valuable addition to standard equipment.

Improved Inspection Lamp

A new and improved version of their self-contained portable inspection lamp has been produced by Nife Batteries, Ltd., of Redditch, Wores. Capable of projecting a long-range high candlepower beam, the equipment, type P.6, was designed primarily to meet the rigorous working conditions encountered in the inspection of overhead power transmission lines. Many improvements in detail have been made. The equipment consists of a 6-8 volts nickel-cadmium alkaline battery of miners' lamp design, carried on the back of the operator and connected by flexible cable to the compact robustly constructed projector using a double-filament high efficiency bulb. Of all-steel construction and, therefore, virtually indestructible, the battery comprises six cells of sufficient capacity to provide three to four hours' light on the major 18-watts filament, and about 20 hours on the 3-watts reserve. It can be left for indefinite periods in a charged condition without risk of deterioration. A push on/off switch is positioned by the projector handle to allow for easy one-handed control. In use, the battery is contained in a stout leather case, and this, together with a leather bag for the projector, is attached to a carrying harness to give the maximum comfort and minimum fatigue.

Plans for Mexican Shipping

The Central American Chambers of Commerce and the Institute for the Promotion of Economic Exchange of Mexico have advanced proposals that Mexico should establish an adequate merchant marine to handle traffic between Mexico and Central American countries. Antonio Arellano, president of the Institute and also of the recently formed Committee for a Merchant Marine, has stated that adequate shipping would permit Mexico to channel its surplus production to nearby markets. This would lead not only to a strengthening of Mexico's economic position, but also increase friendly relations with Central American neighbour countries. While President Alemán's programme has made great strides in road construction, railroads, irrigation projects, electrification, etc., nothing has been done until now to provide for an adequate merchant marine. But the President has agreed to inaugurate work on the maritime project and officials of the Institute and the Committee for a Merchant Marine are to meet with the President's advisers soon to work out a feasible programme.



Tug for East African Service

Designed for harbour and coastal towage on the East African coast, the single-screw steam tug *Arusha* has been completed for the British India Steam Navigation Co., Ltd., by Henry Robb, Ltd. Of about 280 tons gross, she has dimensions of 112 ft. 6 in. length, 32 ft. breadth and 13 ft. 3 in. depth. The propelling machinery has been supplied and installed by White's Marine Engineering Co., Ltd. It consists of a triple-expansion steam engine having a designed power of 800 i.h.p. On full power trials the designed horsepower of the engine was easily attained, a maximum free running speed of over 12 knots being recorded. The delivery of the *Arusha* from Leith to Mombasa has been undertaken by Pedder & Mylchreest

New Danish Collier

The single-screw steam collier *Th. Adler Svanholm* has been delivered to her owners, the Danish Coal Co., Ltd., of Copenhagen, by the Elsinore Shipbuilding & Engineering Co., Ltd. The vessel is a self-trimmer of about 2,800 tons gross. A deadweight of 3,875 tons is carried on a draught of 19.43 ft. Her principal dimensions are 299 ft. length b.p., 47.8 ft. breadth moulded, 26.73 ft. depth to raised quarter deck and 21.5 ft. depth to upper deck. The cargo holds are served by four large hatches, there being four 3-tons derricks with a similar number of attendant steam winches. The main engine was supplied by the shipbuilders and comprises a 3-cylinder turbo-compound steam engine with exhaust turbine. This engine develops 1,800 i.h.p. at 115 r.p.m. and provides the ship with a loaded speed of 12 knots

Motor Cargo Vessel from Burntisland

A cargo motorship of 5,575 tons gross has been handed over to the Stanhope Steamship Co., Ltd., by the Burntisland Shipbuilding Co., Ltd. She is the open shelterdecker *Stanburn*, fitted with a topgallant forecastle, raked stem and cruiser stern. With a deadweight of 10,350 tons on a draught of 25 ft. 10 in., she has a length o.a. of 462 ft. 3 in., b.p. 435 ft., breadth 59 ft. 6 in., depth moulded to shelter deck 38 ft. 11 in. and a depth moulded to second deck of 28 ft. 11 in. There are five cargo holds, of which No. 3, immediately forward of the engine space, may be used as a deep tank for water ballast. The cargo is handled by double derricks and steam winches at each hatchway, while, in addition, there is a 30-tons derrick for heavy lifts fitted at No. 2 hatchway. Built by R. & W. Hawthorn, Leslie & Co., Ltd., the main engine is a 4-cylinder two-stroke opposed-piston Doxford-type diesel engine arranged to burn heavy oil. The engine develops 3,300 b.h.p.

NEW CONTRACTS

Yards in Great Britain and Northern Ireland

Shipowners	No. of Ships	Type	Approximate Tonnages: Gross	Approximate Tonnages: Deadweight	Dimensions (ft.)	Speed (knots)	Propelling Machinery	Total h.p.	Engine Builders	Shipbuilders
Larrinaga S.S. Co.	1	Cargo	—	10,000	—	—	Doxford diesel	4,200	—	Wm. Pickersgill

Commonwealth and Foreign Yards

H. M. Gehrckens, Hamburg	1	Cargo	—	4,200	—	—	Diesel	—	—	Lubecker Masch.-Ges.
Johann M. K. Blumenthal, Hamburg	1	Cargo	—	3,880	—	—	—	—	—	Lubecker Masch.-Ges.
Indonesian Govt.	1	Dredger	—	—	—	—	Steam	—	—	Lubecker Masch.-Ges.
	1	Suction dredger	—	—	—	—	Diesel	—	—	
Ernst Russ, Hamburg	2	Cargo	—	2,250 (each)	—	—	Diesel	—	—	Werft Nobiskug G.m.b.H., Rendsburg
Thailand owners	170	Miscellaneous small craft	2,962 (total)	—	—	—	—	—	—	Tohoku Dockyard Co.
Liberian owners	1	Tanker	1,780	—	—	—	—	—	—	Uraga Dock Co.
Keystone Shipping Co., Philadelphia	2	Tankers	—	18,000 (each)	—	—	—	—	—	Bethlehem Sparrows Point Shipyard, Md.
Ceylon Govt.	14	Lighters	—	—	63 o.a. × 16 × 7	—	—	—	—	Scheeps. de Hoop, Hardinxveld
French owners	1	Tug	—	—	—	—	Diesel	1,200	—	Scheeps. en Mach. de Biesbosch, Dordrecht
French owners	5	Hopper barges	—	—	—	—	—	—	—	Werf Gusto, Schiedam

LAUNCHES

Yards in Great Britain and Northern Ireland

Date	Shipowners	Ship's Name and/or Yard No.	Type	Approximate Tonnages: Gross	Approximate Tonnages: Deadweight	Dimensions (ft.)	Speed (knots)	Propelling Machinery	Total h.p.	Engine Builders	Shipbuilders
Oct. 27	James W. Cook & Co.	*Kestrol* (1047)	Tanker	74	—	—	—	Diesel	—	—	J. W. Cook & Co., Wivenhoe
Nov. 15	National Sea Products, Halifax, N.S.	*Cape Bonnie*	Trawler	395	—	137 b.p. × 26.5 × 13.75	—	Tr.-exp. steam	700	Amos & Smith	Cochrane & Sons
Nov. 15	British & Burmese S.N. Co.	*Kodeik* (1066)	Cargo	7,400	—	—	—	Diesel	—	—	Lithgows
Nov. 16	Clyde Shipping Co.	*Flying Petrel* (403)	Tug	295	—	105 × 27 × 12.8	—	Tr.-exp. steam	—	—	Ferguson Bros. (Port Glasgow)

Commonwealth and Foreign Yards

Sept. 4	Nitto Shosen Co.	*Meiwa Maru* (263)	Cargo	4,660	7,200	377.25 × 53.48 × 29.54	—	Steam turbine	2,800	—	Namura Shipyard Co., Osaka
Sept. 15	Adolf Wiards, Bremen	*Carsten Witt*	Cargo	—	2,750	254.66	11	M.A.N. diesel	1,200	—	A. G. Weser, Bremen
Sept. 16	Idemitsu Kosan K. K.	*Nissyo Maru* (466)	Tanker	12,000	18,000	—	13.5	Diesel	7,000	—	Harima S.B. & E. Co., Aioi
Sept. 16	Taiyo Kaiun K. K.	*Taigen Maru* (3693)	Cargo	6,650	9,300	450.8 o.a. and 420 b.p. × 57.4 × 33.8	16	B. & W. diesel	4,600	Shipbuilders	Hitachi S.B. & E. Co., Mukaishima
Sept. 18	A.B Transmarin, Helsingborg	*Vava* (116)	Cargo	2,100	3,800	330 b.p. × 47 × 19.83	14.75	8-cyl. Gotaverken diesel	3,700	—	Oresunds-varvet, Landskrona
Sept. 22	Hamburg-Amerika Linie	*Magdeburg* (632)	Cargo liner	2,700	4,850	359.5 × 46	15	5-cyl. M.A.N. diesel	3,400	—	Lubecker Masch.-Ges.
Sept. 26	Ernst Russ	*Burg Sparrenberg* (632)	Cargo	4,150	7,000	398.33 × 56.42	13.75	2-str. M.A.N. diesel	3,600	—	Deutsche Werft., Finken-werder
Sept. 27	A. Kirsten	*Cleopatra* (799)	Cargo	1,400	3,150	239.5 × 42.66 × 17.25 (draught)	11	2-str. Wumag diesel	1,430	—	H. C. Stulcken Sohn, Hamburg
Sept. 28	Nissen Kisen K. K.	*Nissei Maru* (691)	Cargo	6,900	9,500	419.95 × 57.42 × 34.06	—	Steam turbine	4,000	—	Tsurumi Shipyard, Yokohama
Oct. 3	Turkish Govt.	*Karakoy* (738)	Dble.-ended pass and vehicle ferry	1,015	200	180.46 o.a. and 173.25 b.p. × 44.58 × 16.42	—	Quad.-scr., 2-str. Sulzer diesel	1,600	—	Ch. Dubigeon, Nantes
Oct. 9	Bd. Blumenfeld G.m.b.H.	*Ernst Blumenfeld* (872)	Cargo	2,674	5,750	356.7 o.a. × 46.9 × 20.5 (draught)	12	M.A.N. diesel	2,300	—	Howaldts-werke, Hamburg
Oct. 12	Swedish Govt.	*Thule*	Ice-breaker	1,390 (disp.)		205.08 o.a. and 187 w.l. × 50 × 15.92 (draught)	—	Diesel-electric	4,800	—	Naval Yard, Karlskrona
Oct. 13	C.N.P. Frota Nacional de Petroleiros	*Amazonas* (121)	Tanker	11,000	16,200	526 o.a. × 64 × 38.25	14.5	M.A.N. diesel	6,300	—	Uddevallav-arvet A/B
Oct. 13	Deutsch-Afrikanischen Schiffs.	*Kamerun* (533)	Cargo	4,100	6,300	413.42 × 54.16	14	M.A.N. diesel	2,750	—	Flensburger Schiffsbau Ges.
Oct. 17	A.B Svenska Amerika Linien, Gothenburg	*Borgholm* (117)	Cargo liner	1,730	2,900	249 b.p. × 42.33 × 28.66	12.5	Sin.-scr., twin 6-cyl. Atlas diesels	1,050	—	Oresunds-varvet, Landskrona
Oct. 21	Lloyd Triestino	*Europa* (319)	Pass. liner	11,400	—	519.6 o.a. × 68	19.5	Tw.-scr. Fiat diesel	16,100	—	Cantieri di Muggiano, La Spezia
Oct. 23	Rederi A.B Activ, Helsingborg	*Ingrid Gorthon* (339)	Cargo liner	1,800	3,450	300 b.p. × 45 × 19.66	14.5	9-cyl., 2-str. M.A.N. diesel	2,550	Shipbuilders	Kockums M.V., Malmo
Oct. 23	Wilh. Wilhelmsen, Oslo	*Tabor* (492)	Cargo liner	5,500	8,300	452.25 o.a. and 420 b.p. × 57 × 39	15.5	6-cyl., 2-str. B. & W. diesel	6,900	Shipbuilders	Akers M.V., Oslo
Oct. 23	Tonnevolds Rederi A.S, Grimstad	*Thorbjorg* (655)	Tanker	8,370	13,000	483.5 o.a. × 59 × 35.5	13	6-cyl., 2-str. diesel	5,300	Shipbuilders	Gotaverken, Gothenburg
Oct. 26	A.S Hakedal, Oslo	*Bjorgholm* (417)	Tanker	11,750	18,350	526 b.p. × 69.75 × 29.25	14.5	8-cyl. B. & W. diesel	7,600	Shipbuilders	Eriksbergs M.V., Gothenburg
Oct. 27	Rederi A.B Walhall, Helsingborg	*J. W. Winck* (450)	Cargo	2,400	3,700	341.2 × 45.9	14	5-cyl. Wumag-Krupp diesel	3,200	—	Lubecker Masch.-Ges.

Date	Shipowners	Ship's Name and/or Yard No.	Type	Approximate Tonnages Gross	Approximate Tonnages Deadweight	Dimensions (ft.)	Speed (knots)	Propelling Machinery	Total h.p.	Engine Builders	Shipbuilders
Oct. 28	Lloyd Triestino	*Asia* (1766)	Pass. liner	11,600	—	519.6 o.a. × 68	20	Tw.-scr., 10-cyl., 2-str. diesel	16,100	Shipbuilders	Cant. Riuniti dell' Adriatico, Trieste
Nov. 3	Rederi A/B Nordstjernan, Stockholm	*Silver Gate* (956)	Cargo liner	6,900	9,050	502 o.a. and 465 b.p. × 64 × 30.33	19.5	Tw.-scr., 7-cyl., 2-str. diesel	16,400	—	Howaldtswerke, Kiel
Nov. 9	Cie. des Transports Oceaniques	*Torima*	Cargo	5,800	7,100	407.2 × 55.6 × 35.2	16	8-cyl., 2-str. Sulzer diesel	5,000	Shipbuilders	Atel. et Ch. de la Loire, Nantes
Nov. 10	Cie. Navale des Petroles, Paris	*Doha* (434)	Tanker	16,500	24,000	603.1 o.a. and 567.5 b.p. × 76.5	14	7-cyl., 2-str. Stork diesel	7,000	—	Netherlands Dock & S.B. Co., Amsterdam
Nov. 10	Cie. Nantaise des Chargeurs de l'Ouest	*Penerf*	Cargo	1,672	1,650	272.33 o.a. and 249.33 b.p. × 39.25 × 24.33	13	8-cyl., 4-str. M.A.N. diesel	1,800	Shipbuilders	Atel et Ch. de Bretagne, Nantes
Nov. 12	Peter Meyer, Oslo	*Havfru* (319)	Tanker	10,300	16,000	500 b.p. × 63 × 38.5	14.5	8-cyl., 2-str., M.A.N. diesel	5,500	Shipbuilders	Kockums M.V., Malmo
Nov. 14	Kon. Ned. Stoomb. Maats., Amsterdam	*Argos* (759)	Cargo	1,800	2,600	260 b.p. × 40.5 × 21	11	8-cyl., 2-str. Sulzer diesel	1,200	—	C. van der Giessen & Zonen's Scheeps., Krimpen a/d Ijssel
Nov. 14	C. H. Sorensen & Sonner, Arendal	*Viva* (336)	Tanker	9,000	13,500	—	—	Gotaverken diesel	—	—	Fredriksstad M.V.

TRIAL TRIPS

Yards in Great Britain and Northern Ireland

Date	Shipowners	Ship's Name and/or Yard No.	Type	Approximate Tonnages Gross	Approximate Tonnages Deadweight	Dimensions (ft.)	Speed (knots)	Propelling Machinery	Total h.p.	Engine Builders	Shipbuilders
Nov. —	Ellerman's Wilson Line	*Cavallo* (406)	Cargo liner	2,400	3,000	290 b.p. × 48.5 × 28.25	13	Sin-scr., twin 8-cyl., 2-str. diesels	3,040	British Polar Engines	Henry Robb
Nov. —	"Secil" Cia. Geral de Cale Cimento	*Secil Nove*	Coaster	650	—	171.9 × 31.4 × 13.9	11	6-cyl. diesel	—	British Polar Engines	George Brown & Co. (Marine)
Nov. 15	Athel Line	*Atheltemplar* (670)	Tanker	9,100	12,875	495.92 o.a. and 465 b.p. × 63.3 × 35.83	12.5	4-cyl. Doxford diesel	—	N.E. Marine	Jos. L. Thompson
Nov. 17	Corpn. of Wallasey	*Leasowe*	Pass. ferry	645	—	145 b.p. × 34 × 12.25	13.75	Tw.-scr., 8-cyl., 2-str. diesel	1,200	Crossley Bros.	Philip & & Sons
Nov. 20	A/S Thor Dahl, Sandefjord	*Thorskog* (476)	Tanker	11,325	16,570	512 b.p. × 69 × 38.5	14	5-cyl. Doxford diesel	5,500	Wallsend Slipway & Eng. Co.	Greenock Dockyard
Nov. 20-21	British Tanker Co.	*British Bulldog* (1803)	Tanker	18,600	28,100	610 b.p. × 81 × 44.5	15	Dble.-red. geared turbine	13,750	Wallsend Slipway & Eng. Co.	Swan, Hunter & Wigham Richardson, Wallsend
Nov 21	China Mutual S.N. Co.	*Atreus* (125)	Cargo	8,300	9,000	462.9 × 62.3 × 31.7	15.5	7-cyl., 2-str. B. & W. diesel	7,000-7,600	John G. Kincaid	Vickers-Armstrongs, Walker

Commonwealth and Foreign Yards

Date	Shipowners	Ship's Name and/or Yard No.	Type	Approximate Tonnages Gross	Approximate Tonnages Deadweight	Dimensions (ft.)	Speed (knots)	Propelling Machinery	Total h.p.	Engine Builders	Shipbuilders
—	Osaka Shosen Kaisha	*Africa Maru*	Cargo	6,127	9,900	439.68 × 61.75 × 30.1	13.5	8-cyl., 2-str. Sulzer diesel	5,600	—	Central Japan Heavy Industries, Kobe
—	Cia. Argentina de Nav. Dodero	*Alberto Dodero* (268)	Passenger	12,000	—	479.66 × 64 × 38	18	Tw.-scr., 10-cyl., 2-str. Sulzer diesel	10,000	Shipbuilders	Kon. Maats. "De Schelde," Flushing
—	C. Minnaar, Overschie	*Andacia*	Coaster	—	765	—	11	Industrie diesel	600	—	Scheeps. "Vooruitgang," Foxhol
—	Nakamura Kisen K.K.	*Asakirisan Maru*	Cargo	6,713	9,900	426.5 × 59.66 × 32.8	—	7-cyl., 2-str Sulzer diesel	5,000	Shipbuilders	West Japan Heavy Industries, Hiroshima
—	A. Bolten, Wm. Miller's Nachfolger	*August Bolten*	Cargo	2,700	5,000	365.5 o.a. × 49.25 × 28.9	12	8-cyl., 2-str. diesel	2,300	Masch. Augsburg-Nurnberg, Augsburg	Deutsche Werfts, Hamburg
—	Hamburg-Amerika Linie	*Duisburg* (444)	Cargo	2,696	4,850	362.25 o.a. and 333 b.p. × 48.5 × 21.16	12	5-cyl., 2-str. diesel	2,300	Masch. Augsburg-Nurnberg, Augsburg	Lubecker Masch.
—	J. Wiltens, Delfzyl	*Hoogezand*	Coaster	500	900	182.7 o.a. and 171.9 b.p. × 30.1	12	8-cyl. Brons diesel	650	—	Scheeps. "Hoogezand," J. Bodewes
—	J. A. Vos, Hoogkerk	*Missouri*	Coaster	351	450	132.8 × 24.5 × 8.3	—	6-cyl. diesel	300	Klockner-Humboldt-Deutz A.G.	Scheeps. Worst & Dutmer, Meppel
—	K. Albers-Panjer	*Omlandia*	Coaster	500	1,000	177.2 × 31.1 × 31.1	11	6-cyl., 2-str. diesel	750	Machb. Kiel A. G.	Bodewes Scheeps., Martenshoek
—	Worms et Cie	*Sauternes*	Coaster	950	1,250	236 × 36.35 × 20.66	12	6-cyl., 4-str. diesel	1,250	Masch. Augsburg-Nurnberg, Augsburg	A. Vuyk & Zonen, Capelle a/d Yssel
—	Zim Israel Nav Co., Haifa	*Tamar*	Fruit carrier	2,372	4,000	326.5 × 46.6 × 28.2	14	10-cyl., 2-str. diesel	3,000	Masch. Augsburg-Nurnberg, Augsburg	Scheeps. "De Merwede," Hardinxveld
Oct. —	Cie. Maritime des Chargeurs Reunis	*Kiffa*	Banana carrier	4,000	1,880	359.02 o.a. and 328.08 b.p. 49.92 × 32.83	17	Tw.-scr., 5-cyl., 2-str. M.A.N. diesel	6,500	Ch. & Atel de St. Nazaire-Penhoet	Ch. & Atel. de Provence Port de Bouc
Nov. 14	A/S Tank, Oslo	*Storheim*	Tanker	11,750	18,400	526 b.p. × 69 × 29.25	14.5	8-cyl., 2-str. B. & W. diesel	7,600	Shipbuilders	Eriksbergs M.V., Gothenburg

CMDR. SIR ROBERT MICKLEM (*left*) and Sir James Reid Young have been appointed joint managing directors of Vickers, Ltd. Sir Robert retired from the Royal Navy in 1919 and joined the Vickers group of companies. In 1942 he was chairman of the Regional Board, Northern Area, of the Ministry of Production, and in the same year his services were loaned by Vickers to the Ministry of Supply. He is chairman of Vickers-Armstrongs, Ltd., Cooke, Troughton & Simms, Ltd., and of Palmers Hebburn Co., Ltd., and is a director of a number of other companies

MR. E. WALKER ELLIOTT, a director of L. Sterne & Co., Ltd., is president for the 1951-52 session of the Liverpool Engineering Society. Mr. Elliott, who is also a director of the Haslam Foundry & Engineering Co., Ltd., served his apprenticeship with William Gray & Co., Ltd. He later joined the Port of London Authority. During the First World War he served as an Engineer Lieutenant in destroyers and Fleet minesweepers and was awarded the D.S.C.

MARITIME NEWS IN BRIEF

From Correspondents at Home and Overseas

MR. D. F. ANDERSON has been appointed chairman of the owners' side of the National Maritime Board in succession to Mr. Basil Sanderson. Mr. Anderson succeeded Mr. Sanderson in the chairmanship of The Shipping Federation last year, but was abroad at the time, and Mr. Sanderson agreed to continue as chairman of the shipowners' side of the National Maritime Board until Mr. Anderson returned. Mr. Anderson, who is deputy chairman of the P. & O. Steam Navigation Company, has been chairman of the Merchant Navy Training Board since 1948.

THE MAERSK CO., LTD., has opened offices at 46 St. Mary Axe, London, E.C.3. The company has been formed as the United Kingdom subsidiary of the firm of A. P. Moller, Copenhagen, managing owner of the Maersk Line, and will act as the general U.K. agents of the line, which operates cargo liner services between the United States and the Far East, and on the trans-Atlantic route to and from the Continent.

AMERICAN EXPORT LINES is to return the 18,000-tons passenger liner *LaGuardia* to the U.S. Maritime Administration on December 12. It has decided not to renew its charter of the vessel, a former troopship, because of its insufficient passenger capacity which makes it impossible to meet the high operating expenses. The *LaGuardia* has accommodation for 600 passengers.

IN RECOGNITION of his long services to the Baltic Exchange, Mr. H. C. Brewer has been elected an honorary member of the Exchange. He has been a member of the "Baltic" since 1904 and a director of the board for 16 years, for the last three of which (1948-1951) he was chairman. Mr. Brewer is only the 15th to be so elected since 1918.

TO MEET the increasing demands of the motor car export industry, Howard Tenens (Shipping), Ltd., have acquired additional premises; a total of 80,000 sq. ft. of covered factory space and eight acres of storage ground are now available at Colchester Avenue, Cardiff.

* * * *

THE APPOINTMENT has been announced of Vice-Admiral C. E. Lambe to be Flag Officer, Royal Yacht, during the forthcoming Royal Commonwealth tour. He will fly his flag in the liner *Gothic*, in which the voyage there and back is to be made. The *Gothic* is at present loading cargo at Liverpool, as it was the express wish of H.M. the King that the ship's cargo capacity should not be wasted during the tour. When loading is completed she will return to the yard of Cammell Laird & Co., Ltd., for the final details of her refit.

MR. J. C. CARR has been appointed to the Board of Thomas Summerson & Sons, Ltd., railway siding engineers, and their subsidiary companies, on his retirement from the post of principal assistant secretary in the Ministry of Supply. He acted for a short period in 1946 as Iron & Steel Controller, and since the termination of the Iron & Steel Control has been concerned mainly with the nationalisation of the steel industry.

THE CHRISTMAS FAIR, to be held on board H.O.S. *Wellington* on behalf of the Foudroyant Fund, will be opened on November 30 by Mr. Richard Dimbleby. H.M. the Queen has kindly promised to send a special gift for sale. The object of the fund is the refitting and preservation of the old frigate *Foudroyant* as a national monument and a holiday training ship for young people.

THE NAME *Orsova* has been chosen for the new Orient liner, similar to the *Orcades* and *Oronsay*, which is on order from Vickers-Armstrongs, Ltd., Barrow. There has been one previous *Orsova*, one of a group of five ships of 12,000 tons gross each built for the Orient Line shortly before the First World War.

AT THE annual meeting of the Tees Conservancy Commission, Alderman B. O. Davies was unanimously re-elected chairman for the centenary year of the Commission. Alderman Davies has been a member of the Commission for 35 years, and for 20 years was chairman of the Works Committee.

MR. JOHN MACLEAN has been elected chairman of the Clyde Navigation Trust in succession to the late Mr. Barclay Hogarth, and Mr. Ian C. Macfarlane deputy chairman.

* * * *

IT HAS been agreed between the committee of management of the United Kingdom Timber Trade Shipowners' Demurrage Association, Ltd., and the Timber Trade Federation of the United Kingdom, that the discharging rate for London shall be reduced from 35 to 25 standards per hatch per day. This took effect for charters signed on and after November 21.

THE HEAD OFFICE of the British Aluminium Co., Ltd., is returning to the former offices of the company at Norfolk House, St. James's Square, London, S.W.1, which have been released from requisition by the Government. As from December 1, all correspondence should be addressed to the company at this address. (Telephone: Whitehall 7868.)

THE death has occurred of Mr. Francis Fraser who was secretary of the British Thomson-Houston Co., Ltd., for 40 years. Mr. Fraser, who retired in 1941, had also been a director of the company for 27 years. He was a fellow of the Chartered Institute of Secretaries.

A MIDLANDS branch office has been opened by the Aluminium Wire & Cable Co., Ltd., at Great Western Buildings, 6 Livery Street, Birmingham, 3. (Telephone: CEN 3370.)

MR. R. P. BIDDLE, docks and marine manager, Southampton, has been elected chairman of the Southern Section of the Institute of Transport.

MAJOR THE HON. GWILYM LLOYD-GEORGE has resigned from the Board of The Superheater Co., Ltd., on his appointment as Minister of Food.

DURING the year ended June 30, 1951, the turnover of Irish Shipping, Ltd., was more than £1,000,000.

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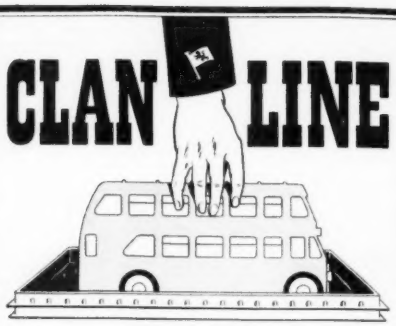

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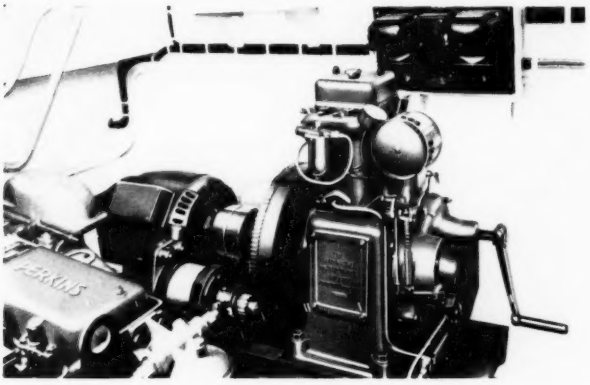

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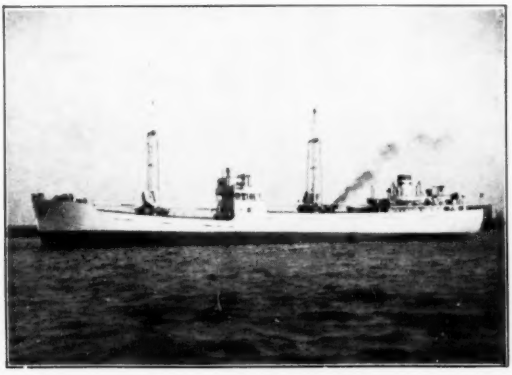

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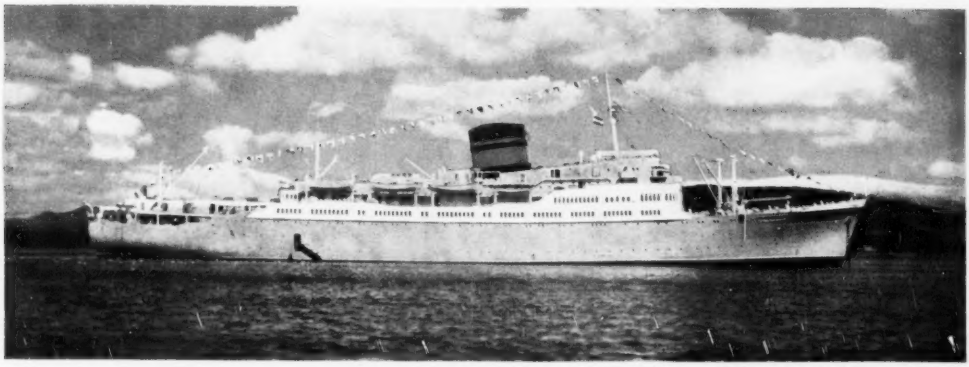

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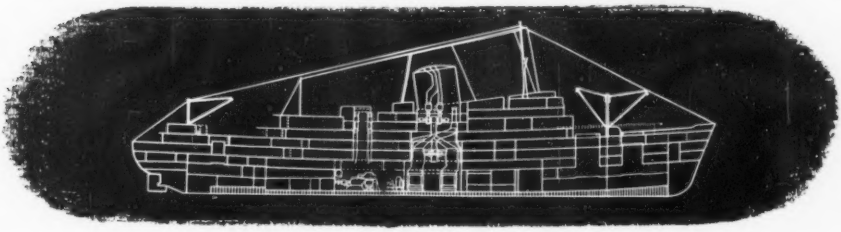

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